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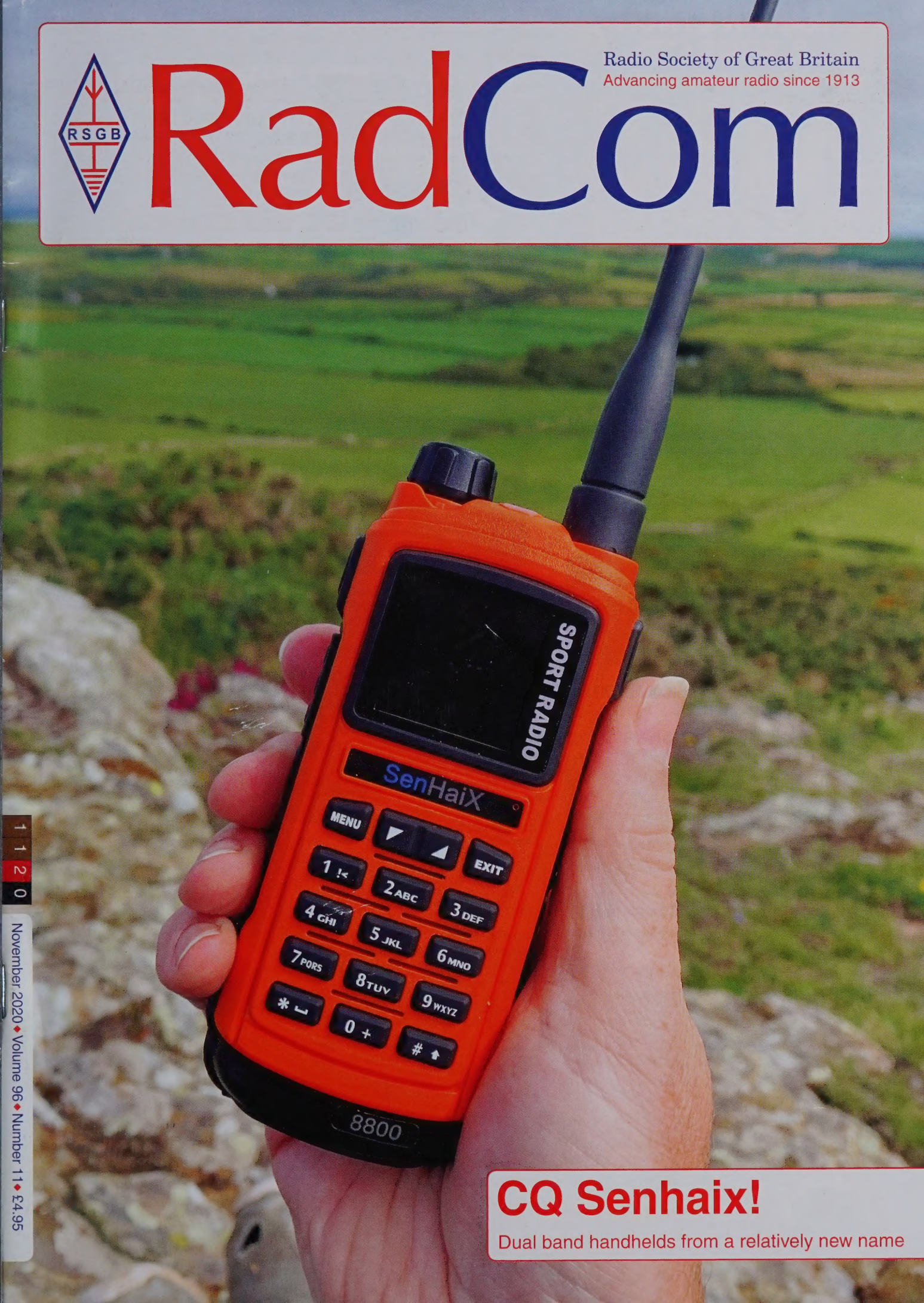

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HF/50MHz 200W Transceiver Twin RX

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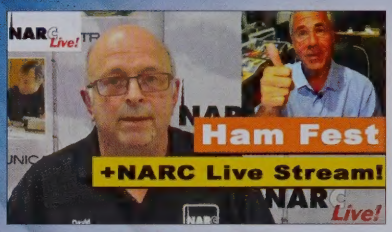

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The new FT-3DE provides reliable 5W RF power output in a compact, light weight design.

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See HamRadio.co.uk/IC705
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Icom IC-7610

The Icom IC-7610 is a complete redesign of the former IC-7600 following on from the huge success of the IC-7300. 100W, Dual band receive and a huge widescreen display.

RRP: £3499.95

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WITH FREE SM-30 DESK MIC OR SP-41 BASE SPEAKER

SEE WEBSITE FOR FULL INFORMATION ON THIS BRILLIANT TRANSCEIVER FROM ICOM.

Icom IC-7100

HF/6m/4m/2m/70cm dstar Base & Mobile Transceiver with remote control head unit.

How many of you spotted the Icom IC-7100 when it was introduced? If you didn't take any notice of the spec, now's the time to have a proper gander at this great radio covering 160-10, 6/4/2/70. It was Icom's first venture into featuring 4m as standard on some of their products and I'm pleased to see they've continued the trend ever since.

At a discounted price of £999.95 you're getting a very special Touch-Screen display radio, all-mode including D-Star, remote control via the optional Icom RS-BA1 & more.

ML&S PRICE: £999.95

Check out the SFTW video May 29th on MLandS.tv on YouTube

Icom IC-R8600

New 100kHz-3GHz Receiver with SDR technology from IC-7300.

ML&S PRICE: £2499.95

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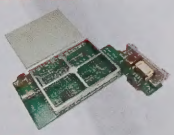
100 Watt - HF/50/70MHz TRANSCEIVER with SSB / CW / RTTY / AM / FM

High quality RF interface module allowing the Icom IC-7300 to have a pure RF signal output for connection to an external SDR receiver.

SEE WEB FOR OUR LATEST SPECIAL OFFER

PTRX-7300 Now available from stock. £189.95



The IC7300 sports HF+6m+4m coverage, it's 100W, houses an eye-catching touchscreen TFT display and includes an internal antenna tuner.

Icom IC-9700

Base Station 2/70/23 all mode including D-Star

These VHF/UHF All-Mode Direct Sampling transceivers sport the absolute latest technology.

AVAILABLE FOR IMMEDIATE SHIPPING.
EXCELLENT PART-EXCHANGE DEALS.

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Built to order like its predecessor, the new IC-7851 is set to be a master-class transceiver of the highest order. Based on the Limited production run and very exclusive IC-7850, the IC-7851 is available today to order. Top prices paid on all trade-ins.

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Latest 2/70 D-Star Touch Screen Transceiver from Icom. Bluetooth connectivity and second station control through an Android device.

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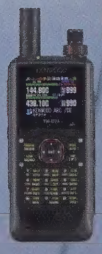

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Direct from the ELAD factory in Italy the FDM-Duo is a compact 5W SDR 160m-6m QRP Transceiver with unique modes of operation.

If you don't wish to be tethered to a PC like so many SDR products the Elad FDM Duo will work as a stand-alone rig offering performance far in advance of anything available today. Connect to a PC & you open up a new world of advanced SDR communications.

FDM-DUO IN BLACK, RED OR SILVER FROM £959.95

RECEIVE ONLY VERSION ALSO AVAILABLE: £729.95

Recent User Review; Having explored the potential of an SDR receiver by running the SDRPlay RSP1a as a band monitor through my FTDX3000, I wanted to try upgrading to the full transceiver experience within a reasonable budget. The little FDM Duo fitted the bill perfectly and also provided me with a portable stand-alone QRP rig. I have to say that this radio is simply amazing. I've used it mainly on evening CW nets on 80m where for inter-G working, signal strength can be challenging. The visual resolution on scope display and waterfall when used with a PC is much better than the RSP1a, which is no slouch when it comes to an SDR receiver. Installation of the software needed a little more effort but the ELAD website has everything you need to complete this, and it installed on the latest version of Windows 10 Pro 64 bit with no issues, although the a software could probably do with an update (last issue was late 2019). In use the little Duo is simplicity itself - very easy menu systems and an adequate manual are more than enough to get you started. I've since paired this up with the matching ELAD Duo ART 120W amplifier and display unit, and I can honestly say it's a match made in heaven. Perfect integration and well worth the money. If you want a top notch SDR transceiver, where a PC can be used to full effect in signal processing, it's hard to find anything to match this radio for the money.

Elad Amplifier DUO ART

HF and 50MHz, 60 or 120W amplifier. Includes power supply, preselectors and remote controller for FDM-DUO.

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Dual-Tuner wideband full feature 14-bit SDR, 1kHz to 2GHz, 10MHz of spectrum visibility. Simultaneously monitor 2 separate 2MHz bands of spectrum between 1kHz and 2GHz. 3 software selectable antenna inputs, & clocking features ideally suited to industrial, scientific, Ham & educational applications. Windows 10.

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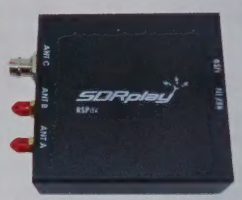
Brand new design, the RSP1A is a major upgrade to the popular RSP1 offering a powerful wideband full featured SDR covering 1kHz to 2GHz & up to 10MHz visible bandwidth. Better still, it's "Built & Designed in Britain"!!

ML&S PRICE: **ONLY £99.95**

SDRplay RSPdx



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Complete redesign of the popular mid-range RSP2pro 1kHz–2GHz receiver. Multiple antenna selection, Improved pre-selection filters, Even more software, Selectable attenuation steps, Special HDR (High Dynamic Range) mode for reception at frequencies below 2MHz.

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The Original & Best
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150kHz-1.9GHz incl SAW Filters.

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HF/6m/2m Transceiver.

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The SunSDR2 DX transceiver based on the well-known SunSDR2 PRO transceiver with several hardware improvements. It is a 100W-HF; 50W-6M; 8W-2M transceiver, very compact, has a separate connector for active cooling and improved supply system, meaning it's perfectly suited for DXpeditions. Also, we've added a separate connector for an external ATU, thus SunSDR2 DX has all the functionality you got used to in our radios and even more. Improved hardware along with the ExpertSDR2 software makes this high-performance SDR transceiver the perfect base station. The evident choice for a true contester!

ML&S PRICE: **ONLY £1899.95**

Click: HamRadio.co.uk/sdr2dx

EXPERT ELECTRONICS

ML&S are the sole UK distributors for the new ZUMspot RPi, an advanced radio module board.

All ZUMspot Packages supplied by ML&S Include: ZUMspot Pi UHF Board, UHF Antenna, Raspberry Pi Zero WH, MMDVM software and Plastic Case

ZUMspot RPi **New Updated Version**
ASSEMBLED AND TESTED: **£159.95**
Featuring DMR, D-Star, C4FM, P25 & NXDN Hotspot.

Advanced Radio Module Board. Paired with a Raspberry Pi and the MMDVM software becomes a small and efficient multi-mode digital hotspot.

For more info see HamRadio.co.uk/ZUMspot

Zum Spot USB!

The ZUM-Spot USB new from KI6ZUM, uses the very popular BlueDv software to create a very versitile and simple to setup PC based hotspot. The ZUM USB comes ready to go with a small antenna and a very classy high quality case, it is a huge upgrade on the very popular DV4Mini and the BlueDV software is the cherry on the cake.

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Zumspot Dualband RPi

(Board only - case included)

ML&S PRICE: **ONLY £159.95**

ZumSpot RPi Duplex

(Top Board Only)

ML&S PRICE: **ONLY £149.94**

Zum AMBE Server

(Board Only)

Allows for audio transcoding for DSTAR, DMR, Fusion, P25 and NXDN. It also supports some variants of dPMR.

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Contents

November 2020

News and Reports

News & Reports
Around Your Region – Club events calendar 85
Around Your Region – Events roundup 89
New products 14
News 12
RSGB Matters 6
Special Interest Groups News 16

Regulars

Advertisers index 93
Antennas, Mike Parkin, G0JMI 18
ATV, Dave Crump, G8GKQ 53
Contesting 48
GHz bands, Dr John Worsnop, G4BAO 64
HF, Martin Atherton, G3ZAY 60
Members' ads 94
Propagation, Gwyn Williams, G4FKH 96
Rallies & events 95
The Last Word 97
VHF / UHF, Paul Marks, G8FVK 62

Reviews

Book review 69
Senhaix 8600 & 8800 dualband handheld, Tim Kirby, GW4VXE 24

Features

Archives of IET, Anne Locker 72
Cambridge Museum of Technology, Clive Ousbey, G0CHO 22
CHOTA 2020 80
GB100GKU, Larry Bennett, G4HLN 58
IARU HF World Championships, Nick Totterdell, G4FAL 34
Trend of IOTA VHF, Cezar Trifu, VE3LYC 54
VDSL, David Lloyd, G8UOD 68

Technical Features

Design notes, Andy Talbot, G4JNT 30
DIY programming lead for Tait T2020, Pete Nicholson, G8UXL 27
PL-259 problems, Graham Dewey, M0OLM 82
Si5351A frequency generator, Richard Tomlinson, G4TGJ 42
Teensy SWR/Power meter, Roger Mawhinney, GI8GZM 38
Vertical with upright folded back counterpoises, Jacek Pawlowski, SP3L 76

Cover image: Senhaix 8800 dualband VHF/UHF handheld (courtesy Tim Kirby, GW4VXE). Design: Kevin Williams, M6CYB.

RadCom THE RADIO SOCIETY OF GREAT BRITAIN'S MEMBERS' MAGAZINE

Managing Editor: Elaine Richards, G4LFM, elaine.richards@rsgb.org.uk
Technical Editor: Giles Read, G1MFG, giles@rsgb.org.uk
Layout and Design: Kevin Williams, M6CYB, kevin.williams@rsgb.org.uk

All contributions and correspondence concerning *RadCom* should be emailed to: radcom@rsgb.org.uk. Alternatively by post to *RadCom* Editor, 3 Abbey Court, Fraser Road, Priory Business Park, Bedford MK44 3WH Phone 01234 832 700, fax 01234 831 496.

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Abbreviations and acronyms we use are listed at http://tinyurl.com/RC-acronyms

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VE/VJ Radio Marathon

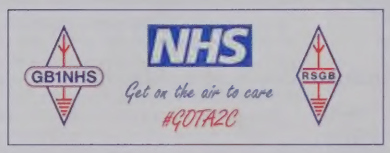
During May and August, the RSGB ran a series of VE and VJ Day commemoration stations using the callsigns GB75PEACE, GB1945PE and GB1945PJ.

The total number of QSOs across all three callsigns was 41,757 and, so far, 60 awards have been claimed. All logs have been uploaded to Logbook of The World and eQSL.

GB75PEACE made 12,671 QSOs, 5,714 of those were CW, 3,802 were digital contacts and 3,158 were using SSB. GB1945VE made 12,654 QSLs, 5,632 of those were SSB, 4,638 were digital and 2384 were using CW. GB1945VJ made 16,432 QSOs, of which 9,556 were using SSB, 4,556 were digital and 2,320 were using CW.

The top three activators were GM3WUX, G3SVK and MM0HVU who worked 7,953, 3,279 and 2,819 stations respectively.

The RSGB would like to thank the organisers and the operators of these stations as well as all those who worked them. 2020 has been a difficult year for everyone and amateur radio has been a good way for many to feel less isolated as well as giving them the opportunity to keep in contact with the wider world.



As part of the RSGB's continuing Get on the air to care campaign with the NHS, we have been working with the BBC recently to highlight amateur radio in a number of ways. BBC Radio Surrey and Sussex ran an interview with RSGB Board Director Stewart Bryant, G3YSX; BBC Radio Somerset aired an interview that included RSGB General Manager Steve Thomas, M1ACB; and BBC TV *Points West* shared the story of ten-year-old Caitlin, M6XTT who passed her Foundation exam via remote invigilation recently after being tutored by her grandfather Don, G3XTT during lockdown.

The campaign was also featured in an Amateur Radio Newsline report. The report includes the RSGB's announcement of the expansion of remote invigilation exams to include the Full licence exam, see www.arnewsline.org and look for 25 September news. You can find out more and listen to each of the interviews on the Society's media pages at www.rsgb.org/gota2c-media.

Region 1 vacancies

In Region 1, the volunteer DR12, Andy Hood, GM7GDE, has stepped down. The RSGB would like to thank him for his service to the amateur radio community in Region 1.

There are now vacancies for District Representatives in Glasgow Central and Lanarkshire; Ayrshire, Dumfries and Galloway and for The Borders region.

If you are interested in any of these vacancies, contact the Regional Representative for Scotland Region 1, Tony Miles, MM0TMZ by email to rr1@rsgb.org.uk. You can also contact Tony if you would like to know more about the role and what is involved.

Full licence remote invigilation

Following on from the success of the remote invigilation exams for the Foundation and Intermediate licence, the RSGB is now expanding that to include Full licence exams. The automated booking system is now accepting exam bookings for all three licence levels. Please note that the earliest date available for exam bookings at any level may be a few weeks ahead. It is important to read the Candidate Instructions before booking an exam. You can find a link to these and the calendar to book your exam on the RSGB website at www.rsgb.org/exampay.

The RSGB's next Tonight@8 webinar on Monday 2 November will be *An Introduction to GNU Radio* by Heather Lomond, M0HMO. Heather will give a beginners' introduction to using GNU radio to create simple amateur radio projects. Starting from the beginning, she will introduce the GNURadio programming environment, develop a little of the theory needed to understand SDRs and then go on to use some simple GNURadio blocks to build a receiver based on one of the super cheap SDRs. Finally, she will show how to build more complex radio systems and where to go to take things to the next level. You can watch and ask questions on the Society's YouTube or BATC channels. For more details see www.rsgb.org/webinars.

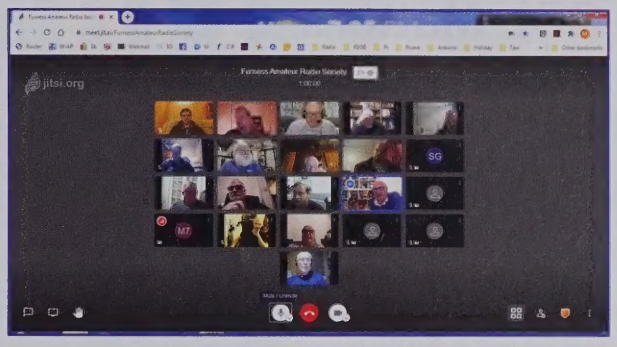
ESC Report

The RSGB's Examinations Standards Committee (ESC) has published its 2020 report that looks back on activities during 2019 – you can read it and previous reports here: https://rsgb.org/main/about-us/committees/examination-standards-committee/esc-reports/

RSGB Board meetings

The proceedings from the RSGB August Board meeting are on the RSGB website. Key points were an IARU Region 1 update from Don Beattie, G3BJ, President IARU Region 1; the continued dramatic rise in numbers of both exam entrants and joining Members that underpins the RSGB's ability to represent the interests of radio amateurs in the UK and Members overseas more effectively; a Legacy Fund grant for the ARDF Committee to allow them to expand support for regional events. To read more go to www.rsgb.org/board and click on Board proceedings in the right-hand column.

Beyond Exams



In October, Furness ARC invited Chris, G1VDP (BE Coordinator), Mark, 2E0SBM, (RR13 and BE champion), Kath Wilson, M1CNY (RR3) and Dave Wilson, M0OBW (RSGB President) to join them on their Jitsi meeting. This was to give details of the Beyond Exams (BE) scheme and have a general chat afterwards. Sadly, Chris had an issue at work crop up just as the meeting started so he handed the reins to Mark to give the presentation while he dealt with it.

The presentation was well received and the club members thought the BE scheme an excellent idea and will be taking up on the activities and having a go. After the presentation, the subjects for discussion ranged from the news of the Full licence going to online exams (alongside the Foundation and Intermediate), to the virtues of digital communication using Zelo and other software, through FT8 and the issues of noise on the bands. Chris, Mark, Kath and Dave would like to thank Furness ARC for the enjoyable evening and the invite to join in the club's online meeting.

In the article in last month's *RadCom*, we got the callsign of Graham, G7LMF incorrect. Our apologies for that. Graham is the Beyond Exams representative for Telford & District ARS.

Region 12 vacancies

A District Representative for District 124 in Region 12 is being sought. Vic Rogers, G6BHE is in the post, but wishes to step away. The RSGB would like to thank Vic for his service to the amateurs within Region 12. The area involved covers East Essex. Anyone interested in this vacancy can contact the Regional Representative, Dave De La Haye, M0MBD by email to RR12@rsgb.org.uk or on 0203 0261 495. Dave is also the contact if you would like more details of the role.

10m propagation study

RSGB's Propagation Studies Committee (PSC) has launched a new study to look at the mechanism behind long-distance inter-UK 10m propagation.

The study came about after PSC chairman Steve Nichols, G0KYA noticed that he was often seeing inter-UK 10m contacts on FT8 occurring between stations that were more than 100 miles apart. "Normally you would expect 10 metres to give contacts out to about 35-50 miles at best," Steve said, "But these contacts, which were often fleeting, were over distances of about 150 miles. I also noticed that they often appeared in the early mornings, but disappeared as the day progressed. We've had to wait for the Sporadic-E season to end to exclude Es as a possible propagation mode."

Steve said that the likely propagation mode was tropospheric, although aircraft scatter or ionospheric scattering can't be ruled out. Either way it warrants closer examination.

To take part in the study just log any UK stations heard via FT8 on 10 metres in excess of 100 miles, making a note of the date, time, received SNR and the location of both you and the distant station. Please also include details of your antenna and any beam heading if applicable. Steve can then compare this with weather patterns and barometric information at the time.

PSKReporter.info and DXMaps.com can also be used to track contacts online.

"We'd like to encourage new amateurs to take part as the reporting isn't too onerous, but the information you supply could be invaluable," Steve said.

Steve can be contacted via email to psc.chairman@rsgb.org.uk.

Practical videos from the RSGB

The RSGB has launched a series of videos to help the thousands of people who have taken their Foundation exam via remote invigilation whilst the Covid restrictions have prevented the practical assessments taking place. The full 30-minute video highlights six practical tasks and each segment stands alone rather than being part of a single 'story' through the video. As well as this whole video, the Society is publishing the different segments as separate short videos to make it easier to go back to just one or two parts again.

As the National Society, we wanted to create a video resource that people could use and return to whenever they needed some support. We know that many clubs and individual radio amateurs have created online training courses and have been helping new licensees with these skills too and we're really grateful for all the support being given by the amateur radio community. With the launch of these videos we now want to add to the resources that new licensees have available to them.

We would like to thank everyone who worked with us on these videos, including Bob and Nick from TX Factor.

You can view the videos on our new web page, www.rsgb.org/foundation-practicals.

More Convention talks online

The RSGB has just published two more 2019 Convention presentations.

In the first, Alwyn Seeds, G8DOH talks about *Coax and connectors, the forgotten ingredient of high performance VHF/UHF stations*. Whilst focused on VHF/UHF, this talk should be of interest to all radio amateurs. The second presentation features Chris Deacon, G4IFX talking about *More on the polarisation of 50MHz signals via Sporadic-E*. He looks at results from previous years and from newer experiments using more comprehensive measurement techniques, which are beginning to help answer key questions about the true nature of Sporadic-E (Es) propagation.

Go to www.youtube.com/theRSGB.

QSL Matters

G8IEM's QSL card caught our eye last month as it looked like a pretty big portable station in a remote location. Further investigation revealed it to be Martin's most enviable remote home QTH in the far North West of Scotland. We processed two QSL cards confirming contacts with NN4X on 50MHz. An SSB QSO in 2012 and an FT8 contact in 2018, how times change. If you take a look at GM8IEM on QRZ.com, you'll be amazed to see how close he is to the beach. If you check out NN4X – well, that's some antenna farm!

Martin was delighted when we asked his permission to show his card. He told us that the nearest VHF station he communicates with is 64km but he has a good take off to most of America, Caribbean and South America. Martin responds to QSL requests 100% and sent us a copy of an amazing 50MHz contact with JA4BXL in Hiroshima.

Unusual callsigns: Last month we mentioned the rise in out-of-sequence callsigns, now being issued on request. What has traditionally looked to us to be a misprint, pirate or simple mistake, can no longer be relied upon and it's becoming a serious problem. Much more time is being spent checking callsigns and trying to trace calls to Membership. Every sub manager has the *2021 RSGB Yearbook*, but print is always behind licence issue. If you have an out of sequence callsign – eg M+2 letters, G5+2 or 3 letters, a G9 callsign or even a callsign from the Q code series – basically anything out of the ordinary and not in the latest callbook, please let the QSL Bureau or your sub manager know that it's a genuine callsign.

Clubs: Similarly, we rely heavily on the *Yearbook's* Regional Section for information on UK clubs. Is your club or group listed in the current edition? If not and you are Affiliated, the appropriate sub manager for each callsign your club holds would be grateful for the information. Club cards should always be collected direct from the callsign's sub-manager, rather than using any via. On this point we've recently seen cards for some newer licensees mistakenly using the club-use-only UK prefixes, such as, MX, MN , MC, etc as their personal regional identifier.

Uncollected GM4-8 cards: Scottish sub-manager Phil, GM3ZZA contacted us to advise that he's recently disposed of some 20kg (around 6,500) uncollected cards sent to GM4-8 call holders. He said it was heart-breaking to see so many really fascinating and interesting cards, covering a wide spectrum of contacts, being re-cycled, all for the lack of an envelope and a stamp. Try as he may, he hasn't been able to get the intended recipients to collect their cards and now many senders won't receive the reply they had hoped for. A sentiment that we echo wholeheartedly. We urge all Members to support their RSGB their sub-manager by keeping the appropriately stamped envelopes in their care.

RadCom basics

The next edition of *RadCom Basics* will be available in November. Articles in the November edition will be:

- Are you making full use of the RSGB? Antennas and planning matters.
- Metal bashing – basic workshop practices
- FT8 digital mode and
- Revisiting a *Start Here* article from May 2010 entitled How filters can help remove interference from outside the amateur bands.

There will also be an updated index of *RadCom Basics* articles.

RSGB Members can read previous editions of *RadCom Basics* by going to www.rsgb.org/radcom-basics. You can register to receive notification of subsequent issues as they become available at the same address. Each edition of *RadCom Basics* explores key aspects of amateur radio in a straightforward way. *RadCom Basics* is sent as an email alert to subscribers when each edition is published. This email provides a list of contents and a link to the articles on the RSGB website.

GB2RS newsreaders vacancies

One of the team of newsreaders for the West of Scotland has stepped down and the RSGB would like to thank Andy Hood, GM7GDE for his long service as newsreader in the West of Scotland covering the 4m and 70cm frequencies. There is a vacancy for volunteers to come forward to assist the existing team of three readers in the West of Scotland. It would be good if volunteers had the capability to broadcast on 4m and 2m/70cm simultaneously and have a QTH that has a good take-off covering Ayr to the south, east out to the Lothians and north into Stirlingshire, with good coverage to the city of Glasgow to the west. If you live in the area, have a Full licence, are an RSGB Member and are interested in joining the team of newsreaders, contact Tony Miles, MM0TMZ by email to rr1@rsgb.org.uk and he will assist you through the process.

RSGB General Manager part of RAC keynote presentations

On 20 September, the Radio Amateurs of Canada (RAC) held its 2020 Conference and AGM online. RSGB General Manager, Steve Thomas, M1ACB was invited to participate in the keynote presentation with IARU President Tim Ellam, VE6SH; ARRL President Rick Roderick, K5UR; and RAC President Glenn MacDonell, VE3XRA as moderator.

The focus was *Amateur Radio during the Global Pandemic and other topics* and it was a great opportunity for each of the guests to share their experiences of the recent global challenges.

On behalf of the RSGB, Steve, M1ACB was able to talk about how in the UK we have seen large numbers joining and returning to amateur radio, Membership of the Society rise as well as interest in amateur radio grow significantly in the mainstream media despite these challenges.

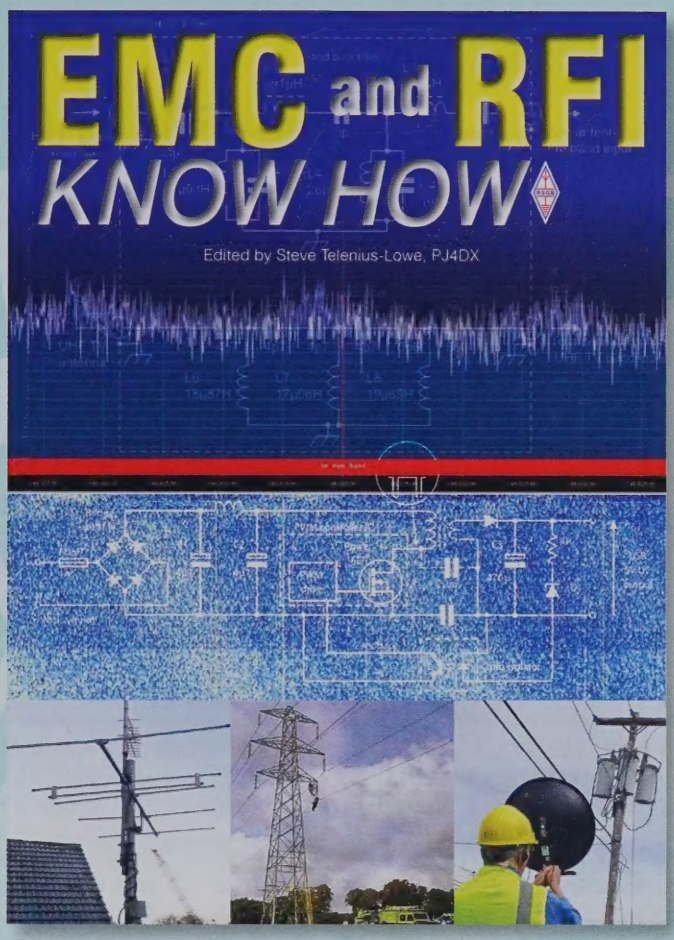
The keynote starts around 00:14:00 in this YouTube presentation: https://tinyurl.com/rac-keynote.

Congratulations

To the following Members whom our records show as having reached 50 years' continuous Membership of the RSGB.

50 years

Mr J Crerar	G3BYV	Mr M J J Dawe	RS23071
Mr D C Sylvester	G3RED	RNARS	GB3RN
Mr A J Richards	GW4RYK		



EMC and RFI *Know How*

Edited by Steve Telenius-Lowe, PJ4DX

Many radio amateurs have Electromagnetic Compatibility (EMC) issues or, as it is more commonly referred to in the US, Radio Frequency Interference (RFI). As a scourge of our time there has been much written about this topic as to cures, identifying the problems and much more. *EMC & RFI Know How* sets out to draw this material together and provide valuable insight into an area that is considered by many to one of the most important problems facing amateur radio today.

This book has drawn on expertise from across the world and includes material from the UK, USA, Germany, Greece and the Netherlands. You will find sections dedicated to sources of interference such as Lighting, xDSL, Renewable Energy, Air Conditioners, Air Source Heat Pumps, Power Line Noise and Power Supplies & Chargers. *EMC & RFI Know How* also takes the reader through practical ways of defeating the problem of interference. Home constructors are well catered for with the circuit of an HF receiver suitable for direction-finding, a preselector to eliminate interference from powerful broadcast stations, filters to stop breakthrough to TVs, and even a 'QRM-Eliminating' antenna. Advice is also given too on how to prevent breakthrough from amateur transmissions spoiling the family's enjoyment of television programmes!

The average home contains numerous electronic devices that can potentially cause interference in the amateur radio spectrum. *EMC & RFI Know How* takes a detailed look at how this interference can occur -- and how it can be defeated. If you suffer EMC and RFI problems or not, this an essential book for every radio amateur's library.

Size 174x240mm, 208 pages, ISBN: 9781 9101 9396 9
Non Members: £13.99, RSGB Members: £11.89

Also available amazon kindle

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RadCom plus

We're pleased to announce that the new edition of *RadCom Plus* (Vol 5, Issue 1) will be published in November at www.rsgb.org/radcom-plus. *RadCom Plus* is the RSGB's digital technical supplement and is edited by Peter Duffett-Smith, G3XJE. This issue includes:

- Tom Allread, VA7TA describes his wide dynamic range field strength meter.
- Tony Preedy, G3LNP shows us how to achieve the enhanced performance of a high 7MHz antenna at a lower height using a design by radio astronomer W8JK.
- Jonathan Hare, G1EXG gives us more 3D printing hints & tips following on from his previous *RadCom* article.
- Rubens Fernandes, VK5FE describes how to add a tracking generator to the SA3000 spectrum analyser he published in the previous edition.
- Mark Foreman, SA6BID and G7LSZ describes using opamps and SPICE simulation to model a water-driven analogue computer from the late 1940s.

You can subscribe to receive email alerts for future issues of *RadCom Plus* at www.rsgb.org/radcom-plus.

RSGB HQ information

RSGB General Manager, Steve Thomas, M1ACB will be on leave for a couple of months from the end of September for some important surgery. The senior staff team at HQ will continue to lead their respective areas for day-to-day activities, supported by Graham Coomber, G0NBI (the previous General Manager), who will be covering the strategic parts of Steve's role in his absence.

WRC23, IARU R1 News

IARU Region 1 has published a further news release following the online CEPT-PTC and CEPT-PTA meetings for WRC-23 prep. The RSGB Spectrum Forum Chair and the RSGB Microwave Manager have been closely engaged at these meetings. You can read more at www.iaru-r1.org/2020/cept-cpg-pta-meeting-september-2020.

The RSGB welcomes to the RSGB family the following new Members who have joined their voice to ours, helping to keep the RSGB strong.

Mr D Jarman, 2E0CYF
Mr R Jones, 2E0FBT
Mr P Penn-Bixby, 2E0IGL
Mr I Vernon, 2E0KUE
Mr D Thomas, 2E0PHE
Mr P Guile, 2E0PXG
Mr D Granville, 2E0RRJ
Mr R Robinson, 2E0RRN
Mr P Ryder, 2E0RYD
Mr S Riley, 2E0SIZ
Mr S Charles, 2E0SSC
Mr R Bearcroft, 2E1DFS
Mr C Burton, 2E1WCB
Mr J McNiece, 2I0FMN
Mr C Niu, 2M0NIU
Mr J Carter, 2W0OWZ
Mr H Silva, CT7AOV
Mr K Rosema, EC1M7AJ
Mr J Milne, G1CIK
Miss C Blount, G1MIS
Mr D Newman, G1NNR
Mr J Rolley, G1NZN
Mr G Taylor, G1SDX
Dr D Coe, G3SLV
Mr M Rees, G3SRR
Mr B Moore, G4DVS
Mr D Chapman, G4PPN
Mr G Pointon, G6MQI
Mr K Mills, G6NTK
Mr C Powers, G7CLP
Mr R Backland, G7DYH
Mr C Campbell, G7KDM
Mr P Evans, G7REH
Mr G Webb, G8INP
Mr D Bourne, G8PZN
Mr C Wood, GI0KMX
Mr C Turner, GI4ARW
Mr P Greenway, GM0PRO
Mr R Biscani, IN3NHZ
Mr K D'Aft, KG4BZB
Mr G Pruitt, KI5DOS
Mr J Borowski, M0FXP
Mr R Searby, M0KLG
Mr K Stock, M0YRX
Mr P Langfield, M1EJL
Mr E Martin, M5UF
Mr T Knight, M6DLR
Mr A Court, M6GAG
Mr T Dyson, M6HTE
Mr J Fairhall, M6JOO
Mr P White , M6PNW
Mr D Reeve, M6ULU
Mr A Lowe, M7AWK
Mr J Hartley, M7AZW
Mr J Strain, M7AZY
Mr S Harper, M7BBP
Mr N Granville, M7BBZ
Mr B Hale, M7BME
Mr J Paul, M7BZF
Mr R Edminson, M7EDM
Mr I Scrivener , M7EHD
Mr E Callow, M7EMJ
Mr J Watterson, M7GHG
Mr I Justice, M7GRH
Mr A Smith, M7GSR
Mr D Robertson, M7HUX
Mr I Larman, M7ICL
Mr I Stanley, M7IDS
Mr I Trendell-Carr, M7ITC
Mr T Gilbert, M7IVY
Mr J Phillips, M7JPH
Mr A Mellor, M7KHI
Mr M Whitfield, M7MBW
Dr M Ashby, M7MGA
Mr M Page, M7MKE
Mr A Campbell, M7NAC
Mr C Antill, M7NAP
Mr P Colman, M7PFC
Mr P Gallagher, M7PHL
Mr D Cockram, M7RQQ
Mr S Farnsworth, M7SSF
Mr K Leung, M7TKA
Mr A Bailey, M7TRJ
Mr A Jones, M7VIB
Mr W Gola, M7WFG
Mr A Thorpe, M7WJX
Mr W Grimes, M7WTG
Mr P Crowley, M7WYE
Mr A Bronson, M7XTT
Mr N Norwood, MI7NPN
Mr D Macgregor, MM3SCQ
Mr P Higgins, MM6PRH
Mr M Findlay, MM7AVZ
Mr J Taylor, MM7JTX
Mr B Farley, MM7LEY
Mr S Hancox, MM7SAH
Mr T Jones, MW7BCM
Dr A Williams, MW7EZF
Mr D Mackes, N3SGA
Mr L Fussell, N4CBS
Mr D Jones, ND2J
Mr F Modler, OE1FLS
Mr G Veitsmeier, OE3VGW
Mr R Holmes, RS200730
Mr M Porter, RS209561
Mr F Chapman, RS215627
Mr M Ward, RS324734
Mr N Rendell, RS327799
Mr J Skinner, RS328947
Mr D Nixon, RS329472
Mr J Merrick, RS330951
Mr P Siviter, RS331095
Mr T Mihalik, RS332065
Mr D White, RS332281
Mr N Conway, RS332824
Mr L Wilkin, RS332947
Mr G Stirling, RS332962
Mr R Elliott, RS333040
Mr A Beaver, RS333043
Mr S Butler, RS333149
Dr J Jones, RS333276
Mr A Threlfall, RS333385
Mr S Thornton, RS333434
Mr S Worsley, RS333473
Mr L Welsh, RS333492
Mr M Merkel, RS333594
Mr P Bragg, RS333615
Mr M Allen, RS333627
Mr A Hardy, RS333635
Mr J Turner, RS333637
Mr M Foster, RS333638
Mr N Parry, RS333669
Master A Parry, RS333670
Miss A Parry, RS333671
Mrs M Parry, RS333672
Mr B Barnes, RS333675
Mr K Long, RS333721
Mr W Slupski, RS333723
Mr S Page, RS333724
Mr P Arnould, RS333730
Mr B Griffiths, RS333746
Mr I McIntryre, RS333762
Mr R Ashton, RS333772
Mr I Cooper, RS333793
Mr G de Putron, RS333798
Mr J Pearson, RS333800
Mr D Miller, RS333812
Mr C le Marchant, RS333848
Mr T Bartholomew, RS333874
Mr N Foreman, RS333896
Mr D Wailes, RS333914
Mr A Morgan, RS333929
Mr J Good, RS333975
Mrs J Worsley, RS333976
Master T Worsley, RS333977
Mr M Francis, RS333978
Mr D Davies, RS333994
Mr D McEwan, RS333996
Mr L Mitchell, RS333997
Mr S Amos, RS334010
Mr P Freeman, RS334014
Mr J Marcelino, RS334017
Mr A Diffey, RS334040
Mr C Fuller, RS334052
Mr P Elwell, RS334078
Mr D Ellis, RS334094
Mr D Ingram, RS334123
Mr N Mortel, RS334124
Mr A Parry, RS334125
Mr R Clark, RS334160
Mr M Rees, RS334161
Rev S McCormick, RS334187
Mr R Caves, RS334188
Mr B Goulding, RS334190
Mr B Hayden, SM5CBM
Mr R Farrell, VE3ELL
Mr B Foley, VE3RVZ
Mr B Peasley, VK2BLP
Mr S Morley, W1LV
Mr R Jordon, W3KQ
Mr E Gerber, W5GCX
Mr A Biddle, WA4SCA

The RSGB would like to welcome back the following Members who have rejoined the Society.

Mr C Wilkinson, 2E0FNJ
Mr K Poulton, 2E0LDN
Mr P Mansfield, 2E0PBJ
Mr P Giraudeau, F6HMP
Mr S Mattinson, G0GBR
Mr P Holden, G0JSG
Mr D G Roomes, G0RQL
Mr N Taylor, G0RUF
Mr J R Atkins, G0SDF
Mr M Donovan, G0TUZ
Mr A R Glauser, G0VXO
Mr L Dowling, G1OTR
Mr L Newman, G4BVM
Mr P Torrance, G4HAK
Mr N Sharples, G4NFS
Mr A Grover, G6DBX
Mr T Law, G6TQL
Mr N Bartley, G7UFO
Mr A Moseley, G7VOT
Mr S Parker, G8TLC
Mr C Jones, GW0JWC
Mr D P Harris, GW0ONU
Mr K Larcombe, GW0PUH
Mr F Jinks, GW3XVQ
Mr I Jones, GW4RDW
Mr M Azzarello, KB3LAN
Mr J Moch, M0HMN
Mr D Byrne, M0IDW
Mr P Waldock, M0LRE
Mr T Molloy, M6CIH
Mr H Fisher, M6IQY
Mr H Morris, MW0VCC
Mr G Kelley, N9FQF

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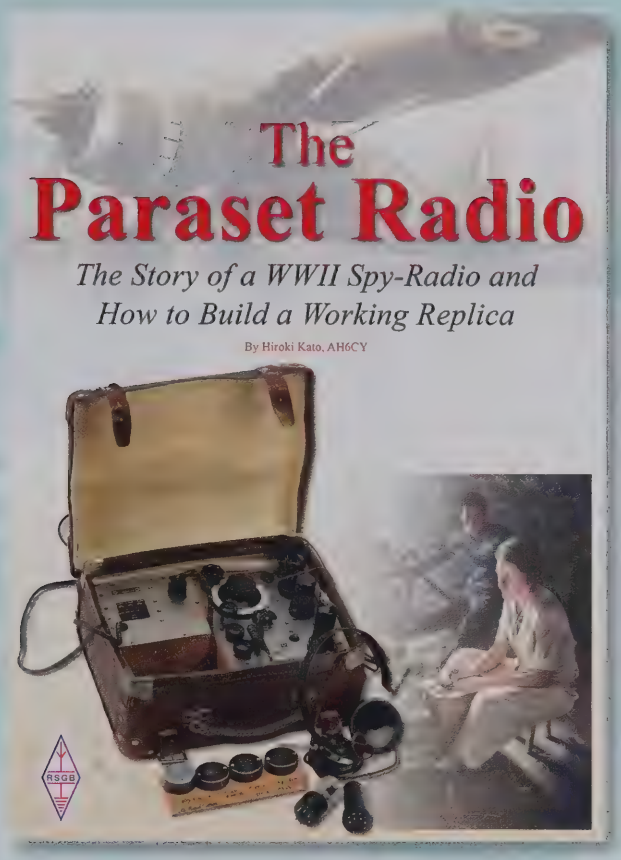

The Paraset Radio

The story of a WWII Spy-Radio and How to Build a Working Replica

By Hiroki Kato, AH6CY

This book describes the gripping story behind the Paraset – a unique spy-radio, dropped behind enemy lines in the dark days of WWII. This radio being both light weight and state of the art for the time was concealed in a suitcase, making ideal for use by the spies of SOE. This book describes how the Paraset was used, the technical specification and even how you might build your own replica.

Written by acknowledged Paraset enthusiast Hiroki Kato, AH6CY this book was inspired by the epic stories connected to this radio and is meticulously researched. These radios were first made in workshops in England at Whaddon Hall and then at Little Horwood, near Bletchley Park. Sadly, most were destroyed at the end of the war and today only a few original Parasets remain in museums and the hands of private collectors. However, inspired by the Paraset stories, radio amateurs across the world have been building working reproductions.

The Paraset Radio provides a history of this remarkable Morse code only radio that was low power (4-5W), had no meters or even an on/off switch. Hiroki relates how the SOE Agents used the radio in occupied Europe and how the radio was developed during the war. There are schematics of the design of the radio along with advice on how to build your own working example that can be used on amateur radio bands. There is also information on building a Paraset from one of the kits available. Hiroki even shares details of some of use he has put his own Paraset radio to on the amateur radio bands.

The Paraset Radio is a rare insight into a radio that provided vital spy communications in WWII. It may also provide the inspiration for you to build your own working Paraset radio, so that you can get a taste of wartime operating, but without the danger of a fatal 'knock on the door'.

Also available amazon kindle

Size 174x240mm, 88 page, ISBN: 9781 9101 9395 2
Non Members: £8.99, RSGB Members: £7.64

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IC-705 transceiver update

Icom UK has announced that the first batches of the IC-705 QRP SDR transceiver are now available from amateur radio dealers. The first deliveries will come with a free gift from Icom UK – an Icom branded 2 in 1 camping lantern plus an Icom baseball caps (while limited stocks last). For more details about the IC-705 including a downloadable brochure, manual and video introduction to this product visit the IC-705 product page at https://icomuk.co.uk/IC-705-HF-VHF-UHF-Mobile-Transceiver/3977/1338/14/.

The IC-705 will have a suggested retail price of £1299.99 including VAT.

QSO Today Virtual Ham Expo

The QSO Today Virtual Ham Expo has announced that all Expo presentations are available by clicking on 'August Speaker Presentations' on the right-hand side of the Expo home page at www.qsotodayhamexpo.com. Topping the list is keynote speaker Scott Wright, KOMD, the editor of *NCJ*, who spoke on *Amateur Radio's Impact on Problem Solving to Create a Global Response to the Pandemic*. Presentations spanned topics from *Portable Operating* by John Jacobs, W7DBO, to *Everything you need to know about Lithium Batteries* by Marcel Stieber, AI6MS and individual presentations given by young amateurs organised by Carole Perry, WB2MGP. The next QSO Today Virtual Ham Expo is set for 13 and 14 March 2021.

IARU Monitoring Service

The Chinese 'Foghorn' over-the-horizon radar (OTH-R) is once again showing up in the logs of the International Amateur Radio Union Monitoring Service (IARUMS) in IARU Region 1 (Europe, the Middle East and Africa). While the reports reflect what's being heard by stations primarily in Europe, the same interference can and does affect other parts of the world, often depending upon the time of day. Named by former IARUMS Region 1 Coordinator Wolf Hadel, DK2OM, because of its sound, the Foghorn was first reported in 2017 operating in amateur bands. The signal is frequency modulation on pulse (FMOP) with 66.66 sweeps-per-second bursts.

"In August, we found significantly more OTH radars from the Far East, especially the system known as 'Foghorn,'" said IARUMS Region 1 Coordinator Peter Jost, HB9CET, noting that the Foghorn facilities generate a signal with a bandwidth of 10kHz. "But also, the notorious Russian 'Contayner' radar still contaminated our bands, especially 20 metres, daily." The Foghorn was being heard on 40m, in the vicinity of 7113 – 7123kHz and 7165 – 7175kHz.

Russian 'Contayner' OTH-R signals were spotted on several 20m frequencies in August. An idling signal on 14.221MHz is believed to be coming from Kazakhstan, showing up every evening. A Foghorn OTH-R has been appearing in the 14.338 – 14.348MHz range.

The role of IARUMS is monitoring the amateur bands to search and identify transmissions sent by intruders and is important because the amount and variety of intruders is rapidly growing. You can read more on the IARU Region 1 website at www.iaru-r1.org.

The Day of YLs

This contest has been created in memory of Carine, F5ISY, who became a silent key in November 2019. Taking place on 7 and 8 November, the aim is to promote YL activity around the world. Running for 48 hours on the 80m, 40m, 20m and 10m as well as 2m using CW, SSB, FT8 and RTTY. The exchanges signal report and YL or OM. The same station may be worked once on each band and mode. An award will be issued to all participants (SWLs also) who has contacted or heard enough stations for the 33 points. YLs count as 3 points, OM as 1 point. You also get 5 points for YLs outside of your own continent and 2 points for OM outside your own continent. Submit your scores to 3830scores.com.

There is more at www.facebook.com/groups/746304389193363/

RASA Podcast

The Radio Amateur Society of Australia has a news podcast. There will be a new Podcast each fortnight and you'll be able to download it via your preferred podcasting service or via the website https://vkamateurradionews.podbean.com/e/vk-amateur-radio-news/

The Podcast will cover topical local news as well as feature articles and they welcome your feedback and questions.

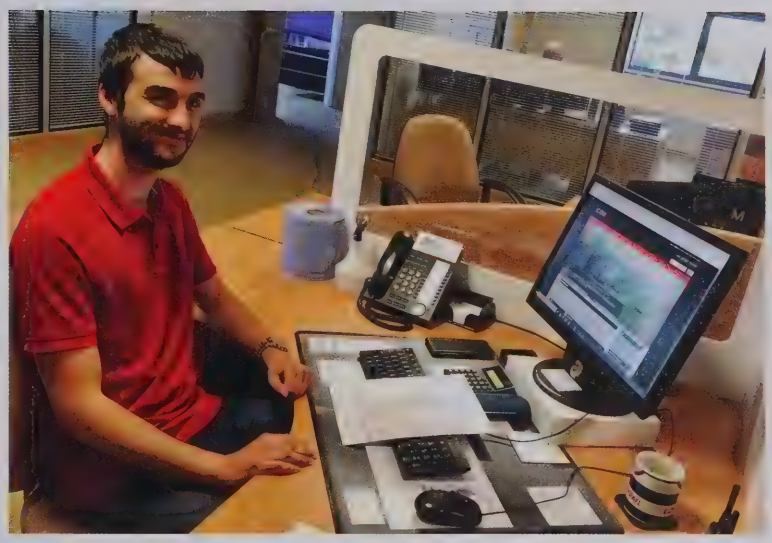
News in Brief

- The 75th anniversary of the post-war ARRL DXCC program will be on 15 November. The first post-war list of DXCC Countries appeared in the February 1947 edition of *QST* and contained some 257 countries.
- An Armistice special event station, GB1BNF, will be on the air between 8 and 11 November run by Coventry ARS. Participating stations will be located in Coventry and Bedworth members' homes. The final timetable will be on QRZ.com.
- The W4CHA/B beacon (EL88) is active again and on 50.0796MHz. The beacon is 2W to a dipole 53m above sea level.
- The 2020 edition of the 2020 ITU Radio Regulations, which will come into force on 1 January 2021, is now available as a free download at www.itu.int/en/myitu/Publications/2020/09/02/14/23/Radio-Regulations-2020.
- Mark, G0KZZ has started a new internet forum for CW enthusiasts at https://forum.brasspounder.net. It is wide ranging, covering amateur CW operating to radiotelegraphy history and key collecting to internet-based CW contacts.
- Pride Radio Group, a group dedicated to inclusion within the amateur radio community, can be found at https://prideradio.group. Membership is free and available to anyone over the age 18 who follows the group's values.

Canadian videos available

Radio Amateurs of Canada has announced that videos from its Annual Conference and General Meeting in September are now available. All presentations may be viewed on the new RAC YouTube Channel (www.youtube.com/channel/UCDLLyrpUUSPugPU4h3Jf5Qw/videos). Presentation topics include *Getting Started with Amateur Radio Satellites*, *Amateur Radio and Youth* and *Contesting: Remote Operating*.

Keeping it in the Family



Congratulations to Callum Stockley as he becomes one of the latest students to pass his amateur radio Foundation course during lockdown.

He is the Commercial Sales Specialist at Icom UK and follows his Dad, Andy, G8ELP, and his grandad (and founder of Icom UK) Dave Stockley, G4ELP into the hobby with the callsign of M7ELP.

Callum was very much a cohort of a new era having to study remotely and then taking the examination after home education. Luckily, there is a huge amount of resource on the web to aid learning in the build-up to a test, plus a wealth of knowledge from his colleagues at Icom UK. The ELP callsign is very special and has been in the Stockley family for over 50 years. Callum said, "I was looking forward to telling my grandad, who was overjoyed at hearing the news. I am hoping to take the next steps to gain my Intermediate and then Full licence soon."

Dave said, "I am very pleased that Callum has achieved his first step in Amateur Radio. I am even more pleased he has secured the callsign M7ELP. My son Andy took on my old callsign of G8ELP so it's nice that another generation of our family has followed in our footsteps with the same ELP tag."

Bath Based Distance Learning Returns

The Bath Based Distance Learning team (BBDL) helped hundreds of students to pass exams under the old syllabus. After reworking their training material, the team are restarting their courses under the current syllabus.

The first new BBDL course will be for the Intermediate level and will run from November 2020 to March 2021.

Students will receive weekly work packages via a virtual classroom and will have access to weekly online tutorials and revision quizzes. Students will also have access to one of the remote tutors who will provide feedback and additional guidance when required. There will be lots of practical exercises to bring the theory to life. Students will be expected to do the exercises at home and report their results. At the end of the course there will be a number of mock exams.

There will be no charge for the training but a refundable deposit of £30 will be required to secure a place. Students will need to provide their own textbooks, electronic parts and tool kits. Students will also have to arrange their own exam at the end of the course, but advice will be provided. It seems likely that the exams will be online with remote invigilation.

To register your interest, please email BBDL Team Leader Steve, G0FUW, via g0fuw@tiscali.co.uk

The new BBDL Full level course will follow on from the Intermediate course running from March to July. A further announcement will be made in the New Year when that course is ready for enrolment.

Cancelled rally

Following the Government's new guidelines for social distancing and events, the Rochdale & District Amateur Radio Society rally that was re-scheduled for Saturday 28 November 2020 will not be able to take place. Like many rally organisers, the club is looking forward to things returning to normal in 2021.

ML&S offer 5 year warranty on the IC-705

From October 2020, ML&S are now able to offer a total of 60 months warranty covering parts and labour for Icom's IC-705 portable QRP transceiver. The IC-705 is supplied with twenty-four months warranty but for an additional charge a further three years is added to the end of the usual factory guarantee. "Many of our customers have been requesting 5 year warranty on the IC-705 especially as it's aimed at out and about field work using portable antennas. As the rigs get more compact and complex, so do the repair costs in the event of a break-down outside the limited warranty period", said Dan Lynch, Operations Director.

Martin Lynch did an unboxing video via his "Something for the Weekend" series on the MLandS.tv YouTube channel.

For more information on the IC-705 with five year warranty see www.HamRadio.co.uk/IC705.

G5MHZ

In the UK, the 5MHz, or 60m band, has been available to Full UK licensees since August 2002. This we owe to the initiative of the late Gordon Adams, G3LEQ, who at the time was Spectrum Director of the Radio Society of Great Britain. He was central to negotiations with the Regulator and the UK Ministry of Defence, the Primary User of the band. One of the elements of Gordon's proposals was a country-wide news reading of the GB2RS. This has taken place regularly on a Sunday since the band's inception by a team of newsreaders. Gordon became a Silent Key in February 2018 and the GB2RS 5MHz newsreading team, as The 5MHz Pioneers Group applied for and received the call G5MHZ. The call will be on the air in recognition and remembrance of the work done by Gordon at 5MHz for UK radio amateurs.

New Products

bhi ATT2 & LLC1 units

bhi have recently introduced the ATT2, a high level to low level audio converter (audio pad) for the bhi ParaPro EQ20-DSP range of amplified parametric equaliser units. The new ATT2 was designed to be used with amateur radio transceivers and receivers enabling a wider range of AF/volume adjustment before the overload LED on the bhi ParPro EQ20 unit comes on, making it less sensitive and easier to use. The ATT2 accepts mono or stereo speaker level signals up to 1 watt (2.828 volts p-p into an 8 ohm speaker), and will attenuate the audio down to a line level of around 1 volt (line level at 10k ohm). It is housed in a small ABS plastic enclosure and measures 55 x 25 x 18mm. Connections are a 3.5mm socket for the input and a 3.5mm plug lead on the output. It costs £24.95 and is available direct from bhi or from one of their authorised dealers.

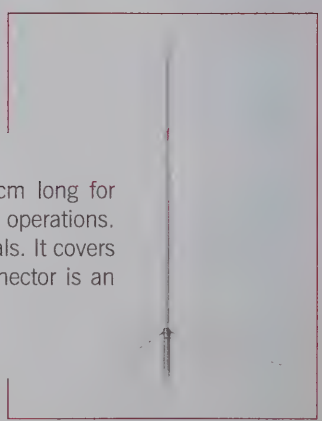
bhi has updated the LLC1 isolated line level converter unit so that it can also be used as an isolated attenuator pad on the input side of the bhi ParaPro EQ20 range as well as a line level converter on the audio output side. This helps customers suffering with RFI or ground loop issues. The LLC1 is still priced at £39.95 and is available from bhi or from one of their authorised dealers.

bhi have upgraded their popular Desktop speaker to the new Desktop MkII. It now includes the latest bhi DSP noise cancelling technology for much improved speech quality. The 10W amplified DSP noise cancelling speaker is suitable for use with most transceivers and receivers but can also be used with SDR and line level signals due the 3.5mm stereo line level input socket on the rear of the speaker, making it suitable use with a wider range of radios. It is priced at £199.95. See www.bhi-ltd.com.

Rfinder HCP-1

The Rfinder HCP-1 is a battery powered Portable MMDVM digital hotspot that gives you on the go digital modes when connected to Wi-Fi or tethered to your phone. It comes fully assembled and tested with the firmware pre-loaded. It is easily upgraded via software and supports DMR, P-25, D-Star, System Fusion and NXDN. The onboard LEDs show status – Tx, Rx, PTT, Mode. There is an integral UHF antenna.

Please note, Moonraker tells us, you will need a reasonable level of computer literacy to set up this piece of equipment. It retails for £249.95 and you can read more at www.moonraker.eu.



Dual Band 2/70 Vertical

The SQBM200C is a compact dual band antenna that breaks down to 80cm long for transportation. This means it can be considered for holiday, mobile or SOTA-like operations. Made from fibreglass it measures 155cm when fully built with three 17cm radials. It covers 144 to 146 and 430 to 440MHz and is rated for up to 200 watts. The connector is an SO239 socket.

Retailing at £54.95, it is available from Moonraker, see www.moonraker.eu

VHF marine handheld

The Moonraker MHR-100 VHF marine transceiver has large keys and an easy-to-grip body. It includes 200 programmable channels with quick channel selection, falling water flash alarm and is waterproof to 1 metre for 30 minutes. It covers the 156 to 162MHz band and has a high/low power selection. It also has both a dual and triple watch system as well as a scan function. It is an entry level marine transceiver suitable for many marine users and retails for £69.95. You can find out more at www.moonraker.eu.

705-Tripod Mount

Icom Japan has employed a ¼in screw thread mount on the bottom surface of their new IC-705 QRP radio. This enables all manner of brackets and stands to be attached & ML&S have found one that not only matches the IC-705 but is lightweight and can be attached to the radio in seconds. The ends of the feet are rubber, so it stays put once the transceiver is mounted. Because it's a mini-tripod design there is a button on the side to adjust the radio body to any angle required. The 705-Tripod Mount is available from stock at £24.95. For more information see www.HamRadio.co.uk/705Tripod.

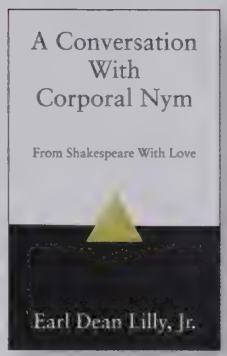
Headphone stand

Whether you use headphones for your hobby or use them for working from home (as many of us have been doing), what to do with the headphones when you aren't wearing them can be an issue. (Mine are draped over the corner of the desk just waiting to fall on the floor again!) This headphone stand has an aluminium alloy centre pole, rubber stabilisers underneath grip the surface and keep the whole stand sitting safely while holding your headphones. It also has soft and protective rubber at the top to prevent any scratches or damage to your headphones. It comes in just three parts and one Allen screw puts it all together. It retails for £11.95 from Martin Lynch & Sons, see www.hamradio.co.uk.

TyT TH-9800 Mobile

TyT has produce a quad band transceiver covering 10m, 6m, 2m and 70cm. It has up to 50 watts output (40W on 70cm) on all bands, FM only. There are 800 memory channels, a dual display with crossband repeater function and removable head. It is available at £199.95 from Martin Lynch & Sons. For more information see www.HamRadio.co.uk/TH9800.

New fiction book



A Conversation With Corporal Nym is an extremely unusual work of fiction, written by Earl Dean Lilly, Jr, KC3DHN. It runs to some 186 pages and is a paperback volume. The book depicts a conversation between an American journalist and a British veteran on the origins and causes of World War II. The conversation delves into questions concerning western governments' police organisations, military and office holders; looking at whether they honour their oaths of office as well as the real political ambitions and goals of political parties. Other questions such as whether everyone has equal opportunities in life or whether things are tilted favour of certain groups within modern society. We found this book an unusual and wide-ranging look at geo-politics in the 20th century.

The name Corporal Nym comes from a fictional character who appears in two Shakespeare plays and he is a soldier and criminal follower. Nym's name is probably derived from the old English word 'nim', meaning 'to take', referring to his inclination for stealing.

For anyone interested, at this time, the book seller AbeBooks.co.uk is listing the book for £12.45 whilst Amazon.co.uk lists the book for sale at £14.95.

New book on Portishead Radio

Portishead Radio – A friendly voice on many a dark night by Larry Bennett was written to commemorate the 100th anniversary of Portishead Radio, GKA, the UK's long-range maritime radio service. It's available through Amazon and other online booksellers priced £9.99. The book aims to 'relate the story (or indeed the rise and fall) of Portishead Radio' and it really does that from the first days of Devizes Radio through the various moves of aerials, equipment and locations to the well-known Portishead Radio. It's not all historical facts and figures though, there are plenty of anecdotes from those who worked there or who worked the operators at Portishead. This really brings the story to life when you see it through the eyes of those who were involved on both sides of the messages going back and forth.

Particularly interesting was the role of Portishead during WWII when ship-to-shore radio messages were silenced – certainly the commercial traffic. But the operators as Portishead kept a listening watch on the marine bands for distress signals or warnings on enemy submarines or aircraft attacks. Finding staff at the time was difficult and the Post Office had to be creative with recruitment. See page 58 for an article on the 100th anniversary celebrations of Portishead Radio.

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CWops Award

The CWops Club is a worldwide organisation of CW enthusiasts with over 2500 members who strive to promote and encourage the use of CW, educate in the skills and use of CW and it supports a range of events and programs that allow members to continually learn, practice and improve their CW skills.

The CWops Award for Advancing the Art of CW is a yearly award to recognise individuals, groups and organisations that have made the greatest contribution(s) toward advancing the art or practice of radio communication by Morse code.

In 2020 there are two recipients for this award:

The Essex (UK) CW Club: for providing a focus for CW interests and then starting bootcamps, where day long intensive CW teaching takes place. Thanks to Essex CW's lead, there are now CW bootcamps held all over the UK and they are making a real difference to CW interest and activity.

Stephen C Phillips: the author and maintainer of the Morse code trainer that has been used by thousands of students in the CW Academy to help them learn Morse code. This web tool was created primarily for beginning students but there are some exercises on the website that can help students at higher levels. The tool has been maintained by Stephen for several years at no cost to the amateur radio community.

CWops announced the winners of the 2020 Awards for Advancing the Art of CW in a 28 July video conference. The video can be found on YouTube. www.youtube.com/watch?v=_tYp318WMPM.

G-QRP Club Virtual Convention 2020

Following the cancellation of the normal QRP Convention at Telford, it was decided to host an online event with G-QRP club members using Zoom.

The committee swiftly decided that this would require assistance from outside the QRP committee. Very quickly Mark, MM0DQM, Bill, K7WXW and Dave, KD3PC stepped in to help.

It took a couple of months to get the basics sorted and a Zoom licence for a couple of hundred visitors. As the word spread it quickly became obvious that a licence for 200 was not going to be enough so we opted for a 500-attendee licence. On the Friday morning with over 500 signed in we had to extend the licence once more. In the end, we had 540 people watching at various times.

The call for people interested in speaking at the event showed that one day wasn't enough so the Sunday was added in too. Club members from all over including several from the USA asked to take part; more on them later.

The event started very well and soon rattled along with little help. First off on Saturday was Hans, G0UPL of QRP Labs who entertained with his background on his kits. Following on was a pair of events with Heather, M0HMO discussing Antenna Analysers and Dom, M1KTA chatting about organising a QRP DXpedition.

Next was HF Propagation predictions from Steve, G0KYA a well-known author on the subject. After the lunch break on one stream was Mark, MM0DQM speaking about his experiments with Mag Loops and milliwatts with Steve, G0FUW giving a beginner's guide to QRP.

One of the highlights of the afternoon was Pete, N6QW spreading the word about his homebrew SSB transceivers, another very well received presentation. The final events of the day were John, VE3IPS discussing misunderstood T2FD dipoles and Gil, F4WBY sharing his knowledge on QRP SDR radios and operating portable.

Sunday started with Calum, M0MCX talking all about vertical antennas, then Bill, G4ERV explaining battery technology and John, G8SEQ discussing omni directional antennas.

Another of the highlights was Anthony, K8ZT giving a live demonstration of FT8 and FT4. Next came a surprise with a rig in a bread bin. Nick, M0NTV explained his totally homebrew radio, constructed in a bread bin. Running alongside this was Les, G0NMD showing is inexpensive shack on a pole and discussing the mechanical engineering side of homebrew.

The final presentation of the day was from Alan, W2AEW explain about Vector Network analysers and Nano VNAs, the latest 'must have tool' in the QRP workshop.

This was a very busy weekend, helped enormously by many members behind the scenes, and the presenters on the screens. Without this help the event wouldn't have happened.

Was it worth it? A resounding success by the comments received that made some of us blush!

Will we do it again? Almost certainly.

Was it the biggest online QRP event – ever? Again, almost certainly with over 500 signed in.

Dick Pascoe G0BPS, Secretary, G-QRP Club

NATIONAL CLUBS & ASSOCIATIONS

Amateur Radio Caravan & Camping Club
membership@arcc.org.uk www.arcc.org.uk
AMSAT-UK http://amsat-uk.org
Open net every Sunday, 10am, ±3.780MHz
Blind Veterans UK Amateur Radio Society
Details at MX0SBV on QRZ.com.
Nets Monday, Tuesday, Thursday, Friday, ±3.715MHz
British Amateur Radio Teledata Group
Datacoms contests and awards
www.BARTG.org.uk
British Railways ARS
Membership@BRARS.info www.BRARS.info
Nets and magazine: see website.
British Young Ladies Amateur Radio Association
www.bylara.org.uk
Net Thursday, ±3.688MHz, 6.30pm.
Civil Service Amateur Radio Society
Weekly net every Tuesday, 8pm, 3.763MHz
CDXC – The UK DX Foundation – cdxc.org.uk
For all interested in HF DX and contesting
Radio Amateur Old Timers' Association
MemSec@RAOTA.org www.RAOTA.org
Nets: see website.
UK Six Metre Group
www.uksmg.org
World Assoc of Christian Amateurs & Listeners
Richard Paul, G7KMZ, G7KMZ@wacral.org
Various nets, see www.wacral.org
Worked All Britain Awards Group
www.worked-all-britain.org.uk
Nets most evenings, ±3.760MHz, time variable

If you would like your Special Interest Group to be listed here, send the information to radcom@rsgb.org.uk before 21 October.

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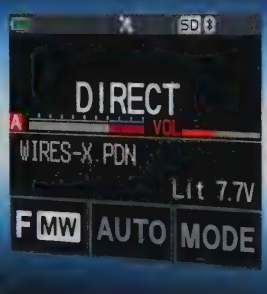
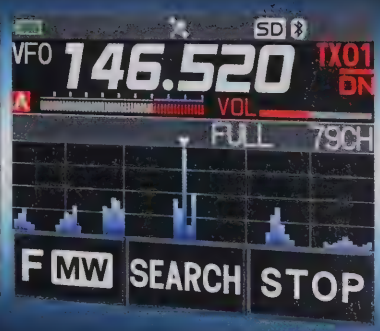
《Actual Size》





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Antennas

Elemental Stacking: Part 2

The theme of combining two Yagi beams into an array concludes this month with an overview of bayed antennas and an example of a stacked array.

Array overview

When two, or more, identical Yagi beams are mounted on a single mast, in the same physical plane, with their individual radiation patterns aligned and fed in phase, then the antennas tend to behave as a single array. This can result in the array's gain being greater compared to using one Yagi beam of the same type. Mounting the two identical Yagi beams one above the other, or beside each other, can provide a theoretical increase in the gain by 3dB compared to just using one of the antennas **[1]**.

When two, or more, Yagi beams are mounted one above the other, in the same collinear plane, they are said to the *stacked*. While, when two identical Yagi beams are suitably mounted side by side, broadside in the same plane, this is often referred to as the antennas being *bayed*.

A major factor influencing the actual gain obtained, whether Yagi beams are stacked or bayed, is the separation used between the antennas (shown as Ss and Sb in Figures 1a and 1b last month). However, feeder cable losses also have an effect on the actual gain attained and this is around 2.5 to 2.7dB.

Bayed Yagi beams

A MMANA-GAL **[2]** antenna model was used to assess the effect of baying two aligned five element 2m Yagi beams as the spacing (Sb) between them was increased from λ/2 to 2λ, where λ was the operational wavelength. The model was run with the array in free space (dBd, blue curves) and at 7m above the ground's level (dBi, red curves). The array's predicted gain, F/B and SWR shown as **Figure 1**, **Figure 2** and **Figure 3** respectively compared to a single identical Yagi beam.

Figure 1 shows the predicted gain for the bayed array as the spacing Sb between its Yagi beams was increased. Both the array's predicted gain dBd and dBi curves follow the same general pattern. When Sb was 3λ/4 between the array's Yagi beams, both the array's gain curves increased by about 2.7dB compared to the single Yagi beam. The array's gain curves then continued to increase to about 2.9dB when Sb was 3λ2, then maintained this level through to 2λ.

Figure 2 shows the predicted front to back ratio (F/B), in dB, for the bayed array as Sb between its Yagi beams was changed. Interestingly, the model shows that there is not a significant difference between the array's F/B curves compared to the single Yagi beam's F/B curves. However, when Sb is 3λ/2, the array's curve at 7m AGL shows a peak in the F/B by about 1.5dB. Generally, the array's F/B is about 16dB in free space and about 19.5dB at 7m AGL.

Figure 3 shows the predicted standing wave ratio (SWR) for the bayed array as Sb between its Yagi beams was varied. Interestingly, both the identical Yagi beam's predicted SWR curves were very close (ie 1:1 in FS and 1.02:1 at 7m AGL) and so are shown as the single black line. The SWR curves for the array at 7m AGL and in free space follow the same general pattern, starting with a high SWR around 3.75:1 when Sb is λ/2. However, as Sb is increased, so the SWR falls and becomes close to around 1.05:1 when Sb is 7λ/8. When Sb is above 7λ/8, the SWR is very close to that predicted for the single identical Yagi beam.

PHOTO 1: The array comprising two stacked 2m Yagi beams in use.

MMANA-GAL predicted radiation patterns at 7m AGL

Figure 4 illustrates the predicted horizontal radiation patterns for the array compared to a single identical Yagi beam. Three radiation patterns are shown for the array where Sb, between its two Yagi beams, is λ, 3λ/2 and 2λ. Essentially, as Sb between the array's Yagi beams increased, the effect on the forward main lobe is to narrow it. This effect decreases the horizontal plane beam width and is the primary reason for the increase in the array's gain. The predicted rear lobe pattern shows some modification as Sb changes. However, its extent does not significantly change and this helps explain why the

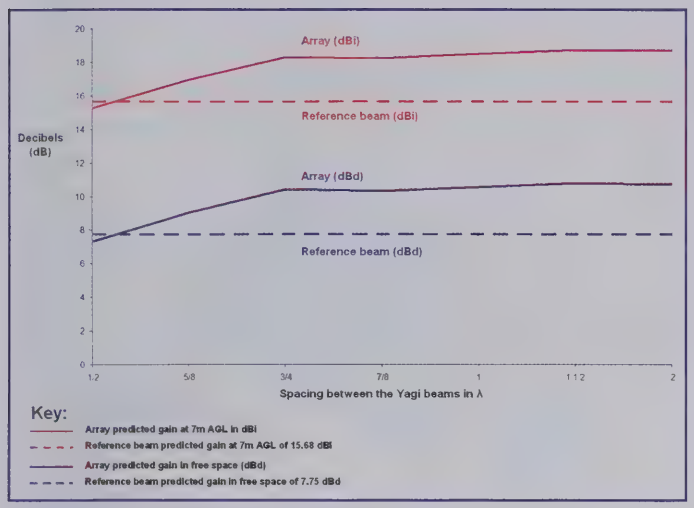
Array (dBi)
Reference beam (dBi)
Array (dBd)
Reference beam (dBd)
Decibels (dB)
Spacing between the Yagi beams in λ
Key:
Array predicted gain at 7m AGL in dBi
Reference beam predicted gain at 7m AGL of 15.68 dBi
Array predicted gain in free space (dBd)
Reference beam predicted gain in free space of 7.75 dBd

FIGURE 1: The MMANA-GAL predicted gains for an array comprising two identical bayed 5 element Yagi beams compared to a single five element Yagi beam.

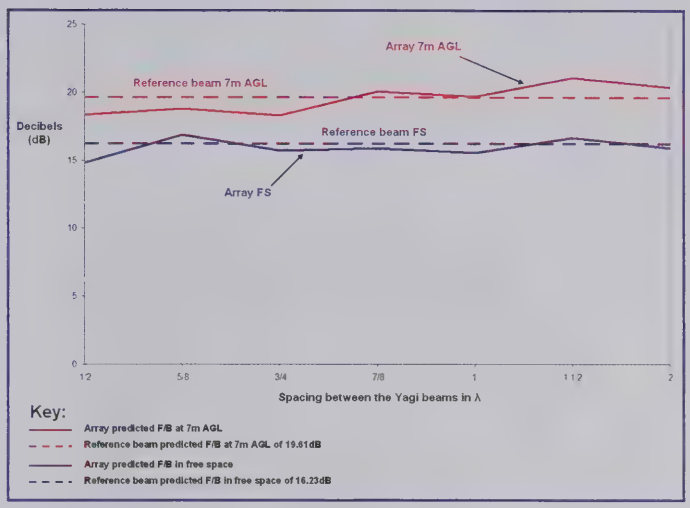
Array 7m AGL
Reference beam 7m AGL
Reference beam FS
Array FS
Decibels (dB)
Spacing between the Yagi beams in λ
Key:
Array predicted F/B at 7m AGL
Reference beam predicted F/B at 7m AGL of 19.61dB
Array predicted F/B in free space
Reference beam predicted F/B in free space of 16.23dB

FIGURE 2: The MMANA-GAL predicted front to back ratio (F/B dB) for an array comprising two identical bayed 5 element Yagi beams compared to a single five element Yagi beam.

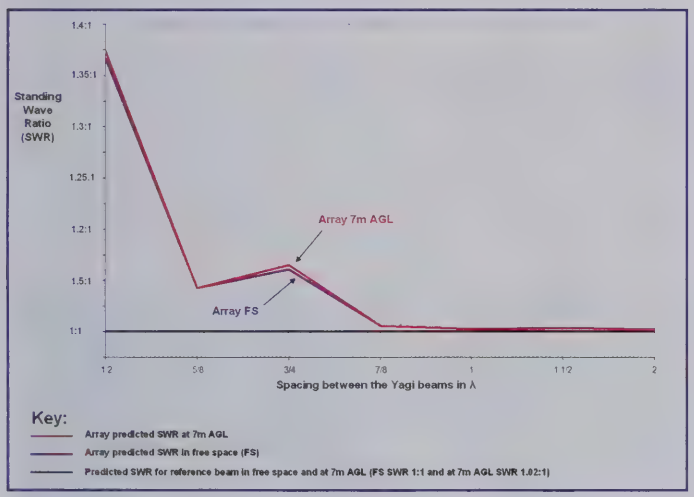
Standing Wave Ratio (SWR)
Array 7m AGL
Array FS
Spacing between the Yagi beams in λ
Key:
Array predicted SWR at 7m AGL
Array predicted SWR in free space (FS)
Predicted SWR for reference beam in free space and at 7m AGL (FS SWR 1:1 and at 7m AGL SWR 1.02:1)

FIGURE 3: The MMANA-GAL predicted Standing Wave Ratio (SWR) for an array comprising two identical bayed 5 element Yagi beams compared to a single five element Yagi beam.

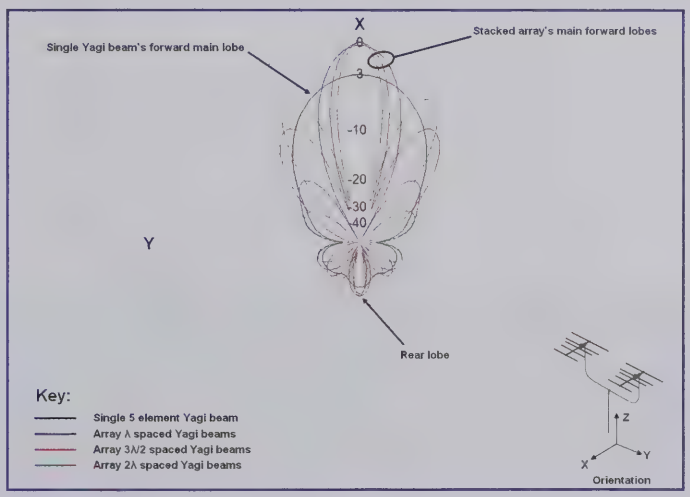

FIGURE 4: MMANA-GAL predicted horizontal plane radiation pattern comparison between two stacked 5 element Yagi beams forming an array and a single identical Yagi beam.

F/B between the array and the single Yagi beam does not significantly vary.

Figure 5 illustrates the predicted vertical radiation patterns for the array referred to the single identical Yagi beam. Again, three radiation patterns are shown for the array, where the spacing between its Yagi beams is λ2, 3λ/2 and 2λ. The prediction shows the lobes follow the same general format. Examining the array's lowest forward lobe group shows the individual lobes closely resemble each other as the spacing Sb between its Yagi beams increases. The array's lower lobe group extends beyond the single Yagi beam's lower lobe by around 3dB, indicating the improvement in the array's gain.

For a bayed array of horizontally polarised Yagi beams, it is generally the action of the array within its horizontal plane that has the major influence on the array's gain through concentrating the RF energy within the forward lobe. The enhancement of the gain from the action of the array in the vertical plane tends to less pronounced, however it does contribute to the array's overall gain.

TABLE 1: 2m Yagi beams details used to form the array.

Element (all 10mm diameter)	Length	Centre-to-centre spacing from previous element
Reflector	1030mm	-
Dipole	1010mm (Each dipole leg was 495mm with a 20mm gap in between)	495mm
Director 1	890mm	135mm
Director 2	890mm	470mm
Director 3	865mm	405mm

Example of two stacked Yagi beams forming an array

When two Yagi beams are stacked into an array, the antennas are usually operated as

Mike Parkin, G0JMI
email2mikeparkin@gmail.com

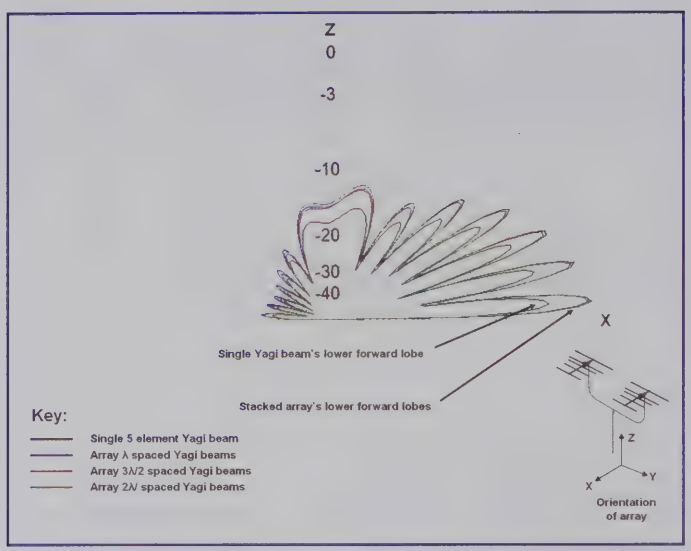

FIGURE 5: MMANA-GAL predicted vertical plane radiation pattern comparison between two stacked 5 element Yagi beams forming an array and a single identical Yagi beam.

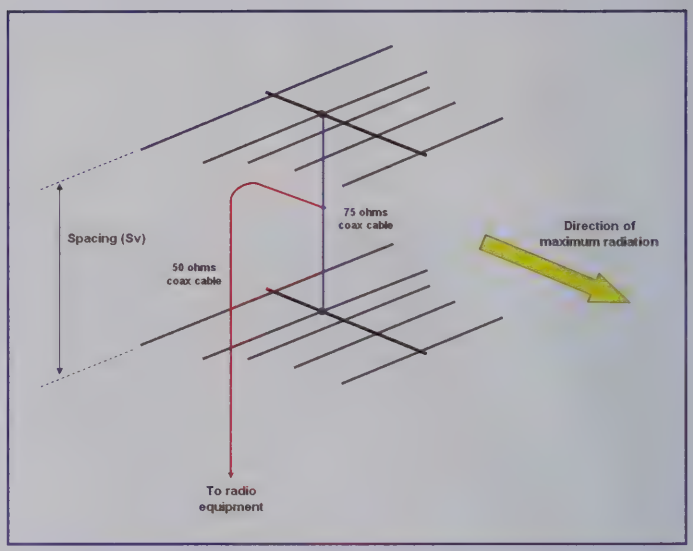

FIGURE 6: Concept of line transformer matching used with a stacked Yagi beam array.

a parallel connection and this can create a mismatch with the coax cable run to the radio equipment. For example, if each Yagi beam's feed point impedance is 50Ω, then they will present an impedance of 25Ω when connected in parallel. This results in a poor match when 50Ω coax cable is used as the feeder, with an SWR of 2:1.

To improve the match, two equal length coax feeder cables can be used as matching λ/4 line transformers. This technique works provided the coax cable used for each λ/4 section has a different impedance from that used for the 50Ω coax feeder cable. The transforming effect is given by [3]:

$$Z_{out}\ (\Omega) = \frac{Z_t^2}{Z_a}$$

where:

- Z_{out} is the impedance presented to the 50Ω coax cable run to the radio equipment.
- Z_t is the characteristic impedance of each λ/4 coax cable section.
- Z_a is the antenna's impedance.

If the coax cable used for each λ/4 section has a characteristic impedance of 75Ω and the antenna's Z_a is 50Ω, then:

$$Z_{out} = \frac{75^2}{50} = 112.5\Omega$$

Each coax cable λ/4 section now presents an impedance of 112.5Ω and these are connected in parallel. Consequently, the impedance now connected to the radio equipment's 50Ω coax cable will be 56.25Ω, giving an improved SWR of 1.125:1. RG59 coax cable is suitable to be used for each λ/4 line section because it has a characteristic impedance of 75Ω, although the coax cable is going to be slightly shorter than λ/4 because of the cable's velocity factor.

Sometimes, it is more convenient to use a longer length of coax cable as the line transformer section and it is possible to use an electrically Nλ/4 long section where N is an odd number (eg 1, 3, 5). However, cable lengths longer than 5λ/4 should be avoided.

As an example of this λ/4 line matching technique, the following uses two stacked 2m band Yagi beam antennas, whose concept is shown in **Figure 6**. The antenna's design frequency was 145MHz (which has a wavelength λ of 2.07m) and each beam comprised five elements. Each Yagi beam antenna was arranged to give a measured feed point impedance of close to 50Ω. The two Yagi beam antennas were stacked in the same plane and spaced 2m apart (λ).

For convenience, each antenna was fed using an electrical 5λ/4 length of RG59 75Ω coax cable, whose physical length was 1.565m. This included a 25mm allowance at the cable's ends to enable its connection to each dipole's feed point and to the 50Ω coax feeder cable. The two RG59 coax cables' ends were parallel connected with the 50Ω coaxial feeder cable in a 'T' configuration by carefully soldering their screens to either side of a small copper-clad PCB strip.

The coax cables' three inner conductors were soldered together, then plumbers' PTFE tape was wrapped around the joint to insulate it. PTFE tape was also wound around the outside of the cables to protect the T-joint. Once completed, the T-joint assembly was covered in heatshrink as a protection against the weather.

The antenna was tested at 145MHz using 10W of transmit power and an SWR of 1.2:1 was measured, indicating a reasonable match between the antennas and the 50Ω feeder cable.

The transmit power to the antenna was increased to 50W and the SWR remained low.

The antenna has been used for many contacts during SSB/CW activity contests and generally for working local SSB stations. **Photo 1** shows the two stacked Yagi beam array in use, while each beam's dimensions are provided in Table 1.

Websearch

[1] *RSGB Radio Communication Handbook,* 13th edition edited by Mike Browne, G3DIH. Section 16, Practical VHF/UHF Antennas, page 16.11.

[2] MMANA-GAL basic V3.0.0.31, freeware antenna analysing application. Original code by Makoto Mori ,JE3HHT. MMANA-GAL basic and MMANA-GAL Pro by Alex Schewelew, DL1PBD and Igor Gontcharenko, DL2KQ. 1999.

[3] *Radio Communication Handbook, 5th edition.* Chapter 12 HF Antennas, pages 12.25 to 12.26.

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Cambridge Museum of Technology

Last year (2019) the Cambridge Museum of Technology reopened after being closed for refurbishment.

The museum is housed in the city's old sewage pumping station. Not only have they steam engines used for pumping but also for also for electricity generation and much of interest for those interested in historic engineering. The refurbishment included the erection of the 'Pye Building' to house exhibitions of two local businesses, the Cambridge Scientific Instrument Company and Pye. The latter was the highlight for me and will probably be of most interest to other radio amateurs, particularly those who have converted their PMR kit or restored any of their wireless sets. On the 2nd Sunday of most months there is also a guided tour by an ex-Pye employee, I recommend checking the website to confirm those, to check opening hours and while Covid-19 continues, to book a visit – https://www.museumoftechnology.com/

The pumping station chimney is probably the first thing visitors approaching the museum will see. Note the museum doesn't have its own car park but some street parking is available nearby. The museum stands by the River Cam and you can walk along it from the city centre in less than 30 minutes.

Photo 1 shows one of the two large Hathorn Davey steam engines in the main Steam Engine Room.

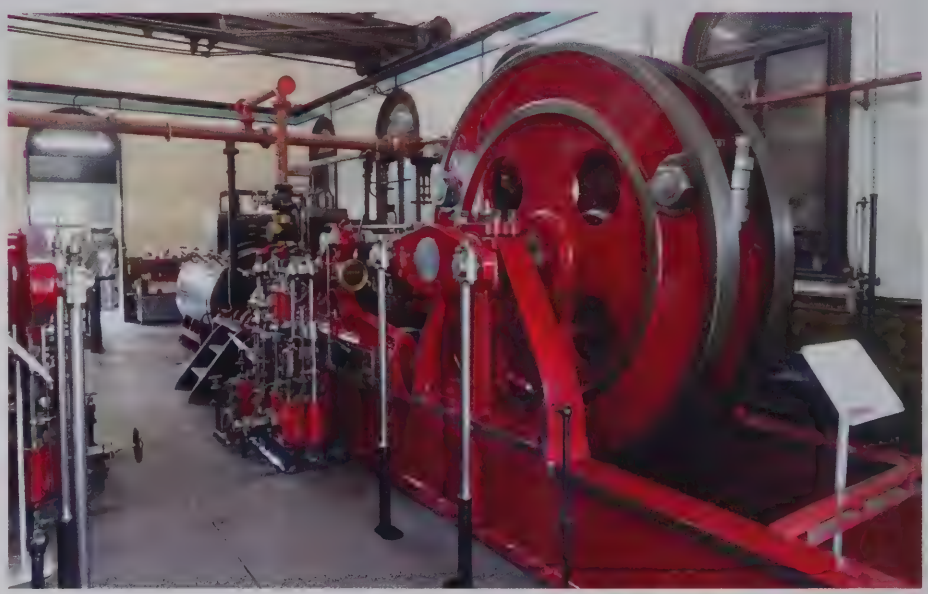

PHOTO 1: One of the two large Hathorn Davey steam engines in the main Steam Engine Room.

The world's first commercially available scanning electron microscope built by The Cambridge Scientific Instrument Company. There are examples of their products such as electrocardiograph and frequency calibration kits used during the 2nd World War by the RAF (**Photo 2**). The company was formed by Robert Fulcher when he left the University of Cambridge's Cavendish Laboratory, he was assisted by Horace Darwin (son of Charles) who later bought out Fulcher. William George Pye was apprenticed with the company when he was 14.

The Pye exhibition has a history of the company from their origins in 1896 when William George Pye started making scientific instruments in his shed. He started W G Pye & Co. having worked for the Cavendish Laboratory after the Cambridge Scientific Instrument Company. His father joined him and he was also assisted by his wife and brothers. By 1913 the company had grown to 40 staff but the First World War saw that rise to 100, with products including aircraft height finders, gun scopes and signalling lamps. Visitors can see the Pye history timeline around the top of the display cabinets.

PHOTO 2: Built by the Cambridge Sceientific Instrument Company.

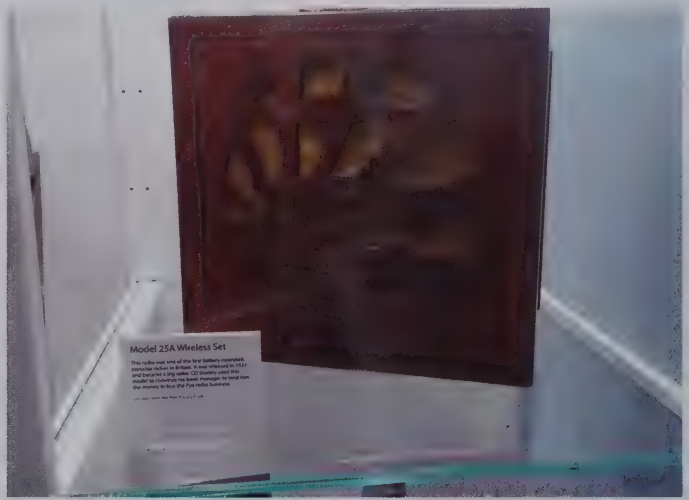

PHOTO 3: One of the first Pye portable battery receivers.

PHOTO 4: Pye started developing television receivers in the 1930s.

PHOTO 5: The well-known No 19 set.

After the First World War the company looked for new markets and started making equipment for teaching the new wireless technology. By 1922 they were selling a modular unit system, the headphones and tuning capacitor being shown in this photograph with the other parts visible in the background pictures. These weren't just used in education but were also bought by wireless enthusiasts. Although technically compliant with the Post Office specifications it was reportedly insensitive and it was later sets, particularly the 700 series that were more commercially successful for Pye. In 1928 the company split with Charles Orr Stanley buying the radio part to form Pye Radio Ltd later becoming just Pye Ltd.

In 1927 Pye launched one of the first portable battery receivers, the model 25A, see **Photo 3**. In the 1930s Pye started developing television receivers, **Photo 4**. The expertise and technology developed was put the use during the Second World War in radar equipment.

As with many other companies, Pye produced much equipment for the war effort. This included the well-known No 19 set later used by many radio amateurs, **Photo 5**. Developing much radio communication equipment during the war years the company anticipated its post war potential and in 1944 formed Pye Telecommunications Ltd. In 1947 they supplied the first commercially available two-way radio system in the UK to a Cambridge taxi company. A lesser known aspect of Pye's wartime developments was for microwave communications. Pye made the receiver and PSU of the No 10 set introduced in 1944 and used after D-day in Europe for encrypted relay links.

The post war years saw Pye expand the television side of the business, later adding broadcasting equipment and cameras under Pye TVT Ltd. On the consumer side they expanded into record players and in 1953 formed Pye Records Ltd.

The VHF Pye Westminster vehicle transceiver was launched in 1967 with AM and FM versions. In later years it was popular among radio amateurs for conversion to amateur use, especially 2m, **Photo 6**. Also in 1967 the Dutch company, N V Philips bought a majority shareholding in Pye, by now a group of companies covering telecoms, domestic and broadcast radio and TV, audio, domestic appliances, scientific instruments and components. In 1977 Pye designed the M252 Pegasus for military use and was used for the UK wide home defence radio network, Project MOULD.

In the 1980s Pye progressed to synthesised radios with the MX290 being the first in volume production. Then, by 1986, the telecommunications business had been fully merged with that of Philips to form Philips Radio Communications Systems (PRCS). In the mid-1990s Philips decided to withdraw from telecommunications and PRCS was sold becoming Simoco International Ltd. In 2002 Simoco sold its TETRA business to Sepura, who were later bought by another name radio amateurs may know, the Chinese radio company Hytera. Both companies are still active in telecommunications although only Sepura are still in Cambridge.

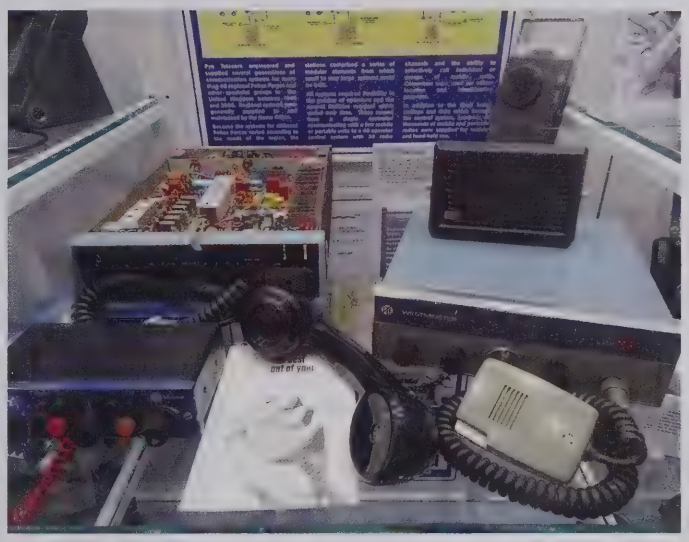

PHOTO 6: The VHF Pye Westminster was often converted for amamteur use.

Some in the display of Pye's hand-held transceivers may also be familiar to amateurs of a certain age who converted them, which makes for interesting viewing. New crystals and a retune of the PF1 and PF70 models in particular gave many their first access to 70cm, usually their local repeater. Some repeater builders/keepers will probably recognise the F400 series base station pair also on display.

I hope this gives you a flavour of the things you can see at the Cambridge Museum of Technology.

Visiting

At the time of writing (September 2020) the opening hours are 10.30am to 4pm Sunday and Monday (The Print Room is closed until further notice) and the last admission is half an hour before closing time. Tickets cost £5 for adults, with concessions being £4 and children aged 8-18 at £3 (under 5s are free). Family tickets are available. The entrance is on Riverside and the museum's address is The Old Pumping Station, Cheddars Lane, Cambridge CB5 8LD. 01223 500652, www.museumoftechnology.com.

Clive Ousbey, G0CHO
g0cho@talktalk.net

The Senhaix 8600 and 8800 144/432MHz FM handhelds

Senhaix is a fairly new brand in the amateur radio market. I first became aware of their products in the Network Radio field a couple of years ago, but they now have some traditional RF products.

This review is going to cover two Senhaix products, the 8600 and 8800. They're both 2m/70cm FM handhelds that are actually quite similar in operation though there are a few significant differences, which I'll discuss later.

With any handheld I look at these days, I apply a simple test: how does it compare for value, features and performance compared to a simple dual band handheld that you could pick up for £20 or so?

Let's look first at the Senhaix 8600. The features highlighted by the manufacturer are:

- Dual Frequency Waiting
- Power switching
- Voice control function
- Voice control delay
- Channel encryption
- 1750 relay
- Power saving mode
- Voltage display
- Scan function
- FM radio
- PTT ID
- Automatic backlight
- Weight: 270g
- Channels: 128
- Power: 5W
- Communications Protocol: Analogue

On taking the 8600 out of the box, the first impression is of a compact unit, fairly slim and light. It's quite comfortable to hold in the hand. Fitting the battery was a quick and easy job and it was soon powered up. Chris Taylor from Moonraker had told me that they supply the 8600 programmed up with all the UK simplex and repeater channels (as well as receive on the PMR446 band).

The Senhaix 8800 (left) and 8600 side by side.

To get the rig scanning, Chris said, just long press the Up Arrow/# key in the bottom right hand corner of the keypad. Sure enough it does! Scan speed is modest, so it will take around 15 to 20 seconds to scan around all the programmed channels. You could, therefore, miss a brief call, but would quickly find an ongoing QSO on a repeater or simplex channel, for example.

The backlit display of the 8600 is nice and clear with a decent contrast between the black, white and red elements. Even in bright sunshine I found it was quite readable.

Of course, although all the repeater channels are programmed up for frequencies, they do not have CTCSS frequencies stored (as these would differ, depending on what part of the country you are in), so in order

The Senhaix 8800 makes a useful rig if you're out walking on the hills.

to transmit to a CTCSS enabled repeater you will need to store a CTCSS tone. I could not find a way of scanning for and setting a CTCSS tone on transmit, which would have given the most flexible approach and Chris Taylor kindly confirmed that the rig has no CTCSS scan feature.

I decided that the simplest thing was to program up my most used local repeaters into memories, complete with their CTCSS tones. Chris had provided a programming lead, so I loaded the Senhaix programming software onto my PC. Fortunately, I had no problem getting the rig to talk to the computer (though the programming lead does use the Prolific drivers that can be problematic at times). As far as I can see, the excellent CHIRP software (https://chirp.danplanet.com) does not talk to the Senhaix 8600, so you will have to use the Senhaix programming software. Actually, I could not find a link to specific programming software for the 8600, so I decided to try the programming software for the Senhaix 8800 and was relieved to find that this worked just fine. The software was pretty standard in operation and I was able to read from the rig, add my new memories and write them back without any problem.

In use

Alright, so I'm ready to try the rig. The user interface of the rig isn't particularly intuitive and the instruction manual not terribly helpful, so there was a bit of random button pressing to try and work out what was what. For example, to switch between the two VFOs you use the Exit key. The Arrow buttons used to navigate through the memories seem the wrong way around to me – but you will soon get used to that. The other thing to highlight is there are *two* PTT buttons. There is a PTT button for each side of the radio (each VFO, if you like). This takes a bit of getting used to if you have always been used to one PTT and I had a couple of instances of transmitting on the wrong frequency and wondering why someone was not responding to me.

Although this sounds quite negative, I actually quite like the rig and don't find it difficult to use, but it is a bit quirky until you get used to it, which in my experience you do, quite quickly.

Sitting in my westward facing shack, with the sea a mile away, I was able to blip up the EI7MLR 70cm repeater on Mount Leinster some 85 miles away (as well as being on a great site, it has a good receiver!) so that seemed promising. I stepped outside to try the rig properly and was pleased to find that I could access the GB3SP repeater near Pembroke on 70cm, which is closer than EI7MLR but over a hilly path! Steve, GW7FBV was kind enough to give me a report and confirm that it sounded like me. It was a sunny day, so I sat outside for a while with the rig scanning to see what was heard. I was pleased to find that the receiver seemed fairly sensitive, particularly on 70cm. Transmit power is 5W on both 2m and 70cm. There's a low power setting too, of 1W.

The ability to scan PMR446 channels was welcome to me and I found quite interesting. Your view may be different depending on where you are. If you don't want to listen to these channels, you can remove them using the programming software. They are, by the way, set up as receive only, although the 8600 would, in theory, transmit there.

Another quirk came to light with a bit of experimentation. A couple of us using the rig discovered that try as we might, we could not program a repeater into memory from the rig's keypad as it was not possible to set up the repeater offset through the menu system. You can, of course, set this up very simply using the programming software and write the data into the rig. Given the somewhat quirky nature of the rig's user interface and menu structure, I think that's simplest anyway and less frustrating. However, if you want to be able to program repeater memories from the rig's keypad, you won't be able to do that, at least with the current version of the firmware. You can program simplex frequencies from the keypad, should you wish.

Something I really liked about the 8600 was the ability to charge the rig from a USB charger. There's a USB port in the back of the rig that you can use for charging. I found this really useful as there is nearly always a USB charger around. There's an LED on the back of the rig that turns from red to green when the battery is fully charged by this method. If you prefer a drop in charger, this is also supplied with the rig.

Despite the '1750 relay' mentioned in the features, there is no facility as far as I am aware for a 1750Hz toneburst on the 8600.

Tim Kirby GW4VXE
longworthtim@gmail.com
Twitter: @gw4vxe

The impressive torch on the Senhaix 8800 – in flashing red, blue and white mode!

If you need that you'll have to, er, whistle... It's possible that this may be implemented in future firmware releases.

Overall

I liked the 8600 and found it a perfectly acceptable handheld. The interface is a little quirky but I did soon get used to it. It's reasonably robust and well made, although I wouldn't subject it to a drop test! I liked the USB charging and I liked the way Moonraker had set it up with the ability to scan all 2m and 70cm channels. Scanning speed is a little slow, but perfectly adequate. If you want to change the programming of the rig, which you almost certainly will to set it up as you wish, you should plan on doing that through the programming software on your computer rather than trying to do it through the keypad of the rig as not all the required options are available. At £59.99 it has a slightly more polished feel about it than some of the much cheaper handhelds on the market.

The Senhaix 8800

Closely related to the Senhaix 8600 is the 8800, which is also a 144/430MHz dual band transceiver. Visually, it looks quite different, with a bright orange casing and a slightly more rugged appearance. The bottom of the rig incorporates a torch that, at first, I thought was a bit gimmicky but is actually quite useful and effective.

Here is the manufacturers' description of the features

- Power Output 5W
- Dual Band
- Dual Watch
- Dual Standby
- LED Flashlight
- SOS Warning
- DTMF Tone
- ANI Code
- PTT ID
- FM Radio
- Encryption
- 1750Hz Tone
- Customise Channel Names
- Bluetooth Programming

The display of the 8800 has a black background and has a mock up of an S-meter (which, to be honest is not terribly useful as signals were either 'full scale' or S2!). It's pretty easy to read in decent lighting conditions although I found it hard to read in full sun, which was a rare occurrence during the review period!

RF performance of the 8800 is largely similar to the 8600 although curiously, I found the receiver of the 8800 more prone to noise on 2m than on the 8600 and had to set the squelch higher to keep the rig scanning. I am not sure what caused this as I did not test the rig in a noisy location. I found the lowest squelch level I could use without the squelch coming open was 'Level 3' but if I wanted the rig to scan without making annoying clicking noises it needed to be set to 'Level 4'.

The Moonraker programming data for the 8600 can be loaded into the 8800 using the Senhaix programming software, which gives the ability to scan all UK 2m/70cm repeater and simplex channels as well as PMR446. Again, like the 8600, the 8800 has no CTCSS scan capability.

What sets the 8800 though, is its Bluetooth programming capability. Senhaix provide an app for both Android and iOS smartphones. Through this app, you have the ability to read the configuration of the 8800 onto your phone, add or edit channels and then write it back to the handheld via Bluetooth – no need for a programming cable. This works particularly well if you want to program a new repeater when you are out and about.

Making wholesale changes is probably easier from the computer programming software but I found the Bluetooth facility ideal for editing the 'mistakes' that seem to inevitably occur when I program a radio. Although you could program all the memories and other settings from the phone, it would take you quite a while. Like the Senhaix 8600, the 8800 uses a Baofeng style programming cable, so if you have one of these already you will be good to go.

Like the 8600, there is a USB charging facility as well as the supplied charging cradle.

The Senhaix 8800 is quite visually striking and the features of a torch and an FM radio although hardly key points for amateur radio use may make the rig an interesting companion on a camping trip or dog walks. Performance was good although the scanning 'noise' issue I discovered on a small number of 2m FM simplex channels was rather annoying, but it may well be that was specific to this model or location. The Bluetooth programming capability was innovative and very useful for making 'on the fly' changes to the memories. USB charging was another plus for me. Having the rig pre-programmed for UK simplex and repeater channels, like the Senhaix 8600 means that you can switch on, scan and pick up any FM activity that is going on in your area. The Senhaix 8800 is £69.95 including VAT.

Both radios are available from Moonraker (www.moonraker.eu) and I thank them for the loan of the review models.

A DIY programming lead for the Tait T2020

Introduction

A number of high quality private mobile radio (PMR) transceivers have been appearing on the market in recent years as they come to the end of their commercial life and/or get replaced by updated technology. Usually there's nothing wrong with them – but they do require re-programming to make them useful on the amateur bands. The software to do this is reasonably readily available but the 'proper' programming leads are hard to come by.

Making programming lead yourself is not a difficult job and you can save yourself a lot of money in the process, not to mention the personal satisfaction of knowing you did it all yourself (and the bragging rights you'll gain at the local club).

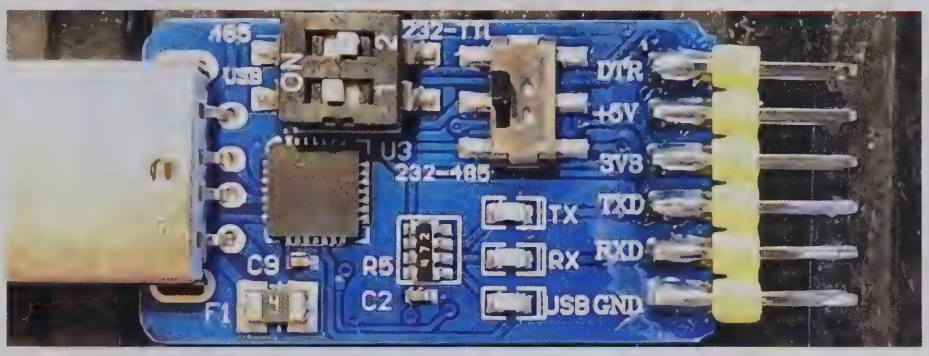

PHOTO 1: Suitable USB to RS-232 converter type A.

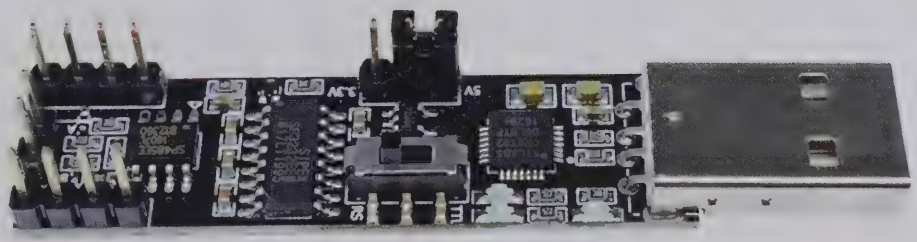

PHOTO 2: Suitable USB to RS-232 converter type B.

Disclaimer!

This programming lead is a nice straightforward project as it uses ready-made, inexpensive, tested modules and is fairly simple to make. This should be a good starter project if you follow the instructions carefully but if you are unsure of your abilities, don't be afraid to ask for help! If you damage your radio it is NOT my fault!!

Like many modern electronic items today the innards of the radios contain is static-sensitive parts so you are strongly advised to use anti-static precautions.

Some unsuccessful attempts have been made to make a programming lead for the Tait T2000 series before but these did not work. This is probably because unlike most serial-programmable radios (which use TTL-compatible signalling) the Tait 2000s require a 'true' RS-232 interface. Many of the commonly available USB-to-serial converters are TTL; you'll need to make sure you buy one that does he job properly. The ones I've successfully used came via eBay for about £3 and were based on a CP2102 chip; the product description was somewhat disparaging about other chips, mentioning PL2303, FT232 and CH341. I don't know how good or bad those chips may be, I merely say that the CP2102-based USB to RS-232 converters that I bought work fine in this application.

Photo 1 shows a close-up of one type. This is a multi-format converter and the switches need to be in the correct position in order for the converter to work in 'RS-232' mode, so the switches need to be as they are Photo 1. With the board oriented as shown, DIP switch 1 is ON, 2 is OFF and the third (metal) switch is 'up' (towards 'TTL' not '485').

The second known-good converter (seen in **Photo 2**) is another "True RS-232 to USB" converter based on a CP2102 chip. They are usually the same sort of price, £3 or so. Again it's a multi-format converter; the switch and link need to be in the positions shown. The RS-232 connections are the cluster of four pins at the far top-left of the board (as seen in Photo 2) and from left to right are ground, Rx data, Tx data and +5V (which we don't use here).

The connections to the radio are made via a 6-pin 'RJ12' plug that goes into the mic socket. You can buy suitable 'RJ12 6p6c' (six pole, six conductor) cables very cheaply; they're usually sold as phone leads. Note they're not Ethernet-type plugs, although they're superficially similar. Cable length isn't relevant but it *is* important that all six pins are present and connected to wires.

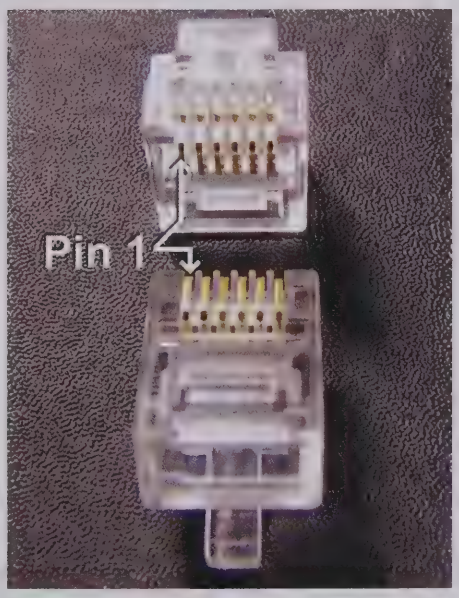

PHOTO 3: Identifying pin 1 on a 6P6C plug. *(Photo: Larry D Moore CC BY-SA 3.0 via Wikimedia Commons).*

Construction

Cut one end off the RJ12 lead, strip back the outer sleeve and identify the wires connected to pins 2, 5 and 6 (see **Photo 3**). These are the radio's Rx data, Tx data and ground respectively. In my case the colours were yellow, white and brown, but your cable may well be different. These wires should be soldered to the corresponding pins on the RS-232 adapter as seen in **Photo 4**.

Basically, that's it! You should now have a working programming lead, but you may like to tidy it up a bit and/or put it a case. You can be as inventive as you like: I've used old USB memory stick cases, as seen in **Photo 5** or, as in **Photo 6**, various types of heatshrink tubing. If you use

Continued on p46

Pete Nicholson, G8UXL
radcom@rsgb.org.uk

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AT-D868UV handheld radio is a VHF and UHF radio with both Digital DMR (Tier I and II) and Analog capabilities. Includes GPS Offering a total of 4,000 channels (Analog and Digital), 10,000 Digital Talk Groups, and up to 150,000 contacts, as well as multiple DMR ID numbers (Radio ID's) for a single radio. **£129.95**

AT-D878UV PLUS BLUETOOTH Digital DMR Dual-band Handheld Commercial Radio with Roaming and GPS VHF/UHF Dual-band Digital/Analog Part 90 DMR commercial transceiver with 1.77 inch colour TFT display and GPS. This model includes DMR Roaming, faster processor and larger memory for future enhancements. Ideal for Fire, Search & Rescue, EMS, Police, Sheriff, Forestry and Security operations. Frequency coverage 140-174 / 400-480 MHz **£199.99**

Accessories

CPL-02 Battery eliminator for AT-D868UV **£9.95**

CPL-01 Car charger ofr AT-D868UV **£8.95**

CPL-05 Speaker microphone for AT-D868UV **£19.99**

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Started in 2001,Baofeng has always been aiming at creating user value and innovating products. From the first small factory of more than 30 people, Baofeng has deveoped into a high-tech enterprise specializing in R&D, production,sales and after-sales service of handheld wireless walkie-talkies as well as accessories.

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Handheld Transceiver

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GT-3 Orginal GT-3 1800 mAh replacement or spare batery for GT-3 ..... **£12.95**

BF-8 6 way charger for BF-888S **£44.95**

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SenHaiX was estabished in 2012 and is in located in the located in the hometown of two way radio Quanzhou city, Fujian Province, China. The company is a high-tech enterprise specialising in radio communications R&D, manufacture of two way communications and accessories.

Handheld Transceiver

8800 Dual band, dual watch, dual standby, 5W Sport radio. This is a rugged and reliable, waterproof, dustproof and shatterproof handie with lots of extras including bluetooth progarmmoing option – amazing avlue at just **£69.99**

New SenHaiX 8600 5W Dual Band Sport Two-way Radio Waterproof Handheld Radio with VOX Function – includes a host of features such as dual band, dual standby, 128 channels, waterproof, VOX, Eco Mode, Scan Function, FM Radio, PPT ID and Automatic backlight plus more . ..... **ALL FOR JUST £59.95**

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Inrico Electronics is a high-tech enterprise which focuses on the design, construction, production and sales of radio communication equipment.

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Handheld POC Network Radio

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Vero Global Communications compant is a science and technology enterprise in Fujian Province, specializing in R&D, production and sales of electronic products and accessories such as radio communication equipment, alarms, radio frequency smart cards, and GPS equipment.

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Leixen having developed a full range of "LEIXEN" series of radios. widely used in transport, construction, telecommunications, security, restaurants, residential property management and other departments and areas, especially popular in the HAM's world.

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ICOM

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1st batch now arrived! 2nd batch due very soon – order now to be on the new list and don't forget we are the ONLY company that offers WATTS to spend on future purchases.

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Gives you on the go digital modes when connected to Wifi or tethered to your phone.

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TRIMAG-S Triple magnetic mount with SO239 antenna fitting with 4m RG58 and PL259 fitted – ideal for those larger antennas..... **just £39.95**
TURBO-S single 170mm magnetic mount with SO239 antenna fitting with 4m RG58 and PL259 fitted – will suit most antennas upto 5ft. **£19.95**
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HKITM-S Mini hatch back mount with SO239 antenna fitting with 4m RG58 and PL259 fitted..... **£32.95**

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Why buy loads of different antennas when Moonraker has one to cover all! SPX series has a unique fly lead and socket for quick band changing

SPX-100 9 Band plug n' go portable, 6/10/12/15/17/20/30/40/80m, Length 165cm retracted just 0.5m, Power 50W complete with 38th PL259 or BNC fitting to suit all applications, mobile portable or base - brilliant! **£44.95**
SPX-200S 6 Band plug n' go mobile, 6/10/15/20/40/80m, Length 130cm, Power 120W, PL259 fitting..... **£44.95**
SPX-300S 9 Band plug n' go mobile, 6/10/12/15/17/20/30/40/80m, Length 165cm, High Power 200W,PL259 fitting **£59.95**

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MRM-100 MICRO MAG 2/70cm, Gain 0.5/3.0dBd, Length 55cm, 1" magnetic base with 4m coax and BNC **£19.95**
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MR777 2/70cm, Gain 2.8/4.8dBd, Length 150cm, 3/8 fitting..... **£19.95**
MRQ525 2/70cm, Gain 0.5/3.2dBd, Length 43cm, PL259 fitting (high quality)... **£19.95**
MRQ500 2/70cm, Gain 3.2/5.8dBd, Length 95cm, PL259 fitting (high quality)... **£26.95**
MRQ750 2/70cm, Gain 5.5/8.0dBd, Length 150cm, PL259 fitting (high quality). **£36.95**
MRQ800 6/2/70cm Gain 3.0dBi/5.0/7.5dBdBd, Length 150cm, PL259 fitting (high quality) **£39.95**
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MRQ900 10/6/2/70cm Gain 10m (2.15dB) 6m(2.5dB) 2m (2.8dB) 70cm (5.5dB) Length:

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RG58M-DRUM-50 military spec RG58 6mm 50m reel **£24.95**
RG58M-DRUM-100 military spec RG58 6mm 100m reel..... **£44.95**
MINI8-DRUM-50 military spec MINI-8 7mm 50m reel **£34.99**
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RG213-DRUM-50 military spec RG213 9mm 50m reel..... **£64.99**
RG213-DRUM-100 military spec RG213 9mm 100m reel **£119.99**
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Lightweight medium and heavy duty swaged masts sets from 1.25-2" diameter 5ft sections to create a lovely 20ft mast – choose the correct size needed for the antenna installation. Masts have a lovely push fit for easy of use and to give a strong connection

MSP-125 20ft Medium Duty (set of 4 poles) 32mm dia 1.6mm gauge.... **£44.99**
MSP-150 20ft Medium Duty (set of 4 poles) 38mm dia 1.6mm gauge.... **£49.99**
MSP-175 20ft Medium Duty (set of 4 poles) 44mm dia 1.6mm gauge.... **£59.99**
MSP-200 20ft Medium Duty (set of 4 poles) 51mm dia 1.6mm gauge.... **£69.95**
MSPX-150 20ft Heavy Duty (set of 4 poles) 38mm dia 2.65mm gauge..... **£69.95**
MSPX-200 20ft Heavy Duty (set of 4 poles) 51mm dia 2.65mm gauge..... **£89.95**

GRP Fibreglass Base Antennas Diamond quality – Moonraker pricing

These high gain antennas have been pre-tuned for your convenience, easy to use, easy to install, and a choice of connection ... look no further

SQBM100P 2/70cm 3.00/6.00dBd, RX 25-2000MHz, Length 100cm SO239..... ~~£49.95~~ **SPECIAL OFFER £39.95**
SQBM200P 2/70cm, Gain 4.5/7.5dBd, RX 25-2000MHz, Length 155cm, SO239..... ~~£54.95~~ **SPECIAL OFFER £44.95**
SQBM500P 2/70cm, Gain 6.8/9.2dBd, RX 25-2000MHz, Length 250cm, SO239..... ~~£74.95~~ **SPECIAL OFFER £69.95**
SQBM1000P 6/2/70cm, Gain 3.0/6.2/8.4dBd, RX 25-2000MHz, Length 250cm, SO239..... **£84.95**
SQBM223N 2/70/23cm, Gain 4.5/7.5/12.5dBd, RX 25-2000MHz, Length 155cm, N-Type **£79.95**
SQBM3000N Triband 2/70/23cm, Gain 4.5/8.3/10.7dBd Length 1.55m **£79.99**
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Our HF wire antennas are made with complete waterproof potted baluns and high quality "original" flexweave antenna wire.

MDHF-80 3.5MHz balun matched mono dipole, length 40m..... **£59.95**
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MDHF-20 14MHz balun matched mono dipole, length 10m..... **£39.95**
OSHF-80 3.5-30MHz balun matched off set dipole, length 40m.... **£59.95**
OSHF-40 7.0-30MHz balun matched off set dipole, length 22m **£44.95**
OSHF-20 14-30MHz balun matched off set dipole, length 11m **£39.95**
LWHF-160 1.8-50MHz unun match end fed antenna, length 42m... **£49.95**
LWHF-80 3.5-50MHz unun match end fed antenna, length 20m ... **£44.95**
LWHF-40 7.0-50MHz unun match end fed antenna, length 10m ... **£39.95**

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All Yagis have high quality gamma match fittings with stainless steel fixings!

YG27-35 Dual band 3/5 element 3.5/12.5 dBd gain with one feed! **£79.95**

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Ideal heavy duty fibreglass masts for those antennas that need to be insulated from metal hardware or pole – convenient 2m lengths in a light grey

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LMA-L 33ft open 7.2ft closed 50-25mm aluminium mast **£119.99**
TMF-1 20ft open 5.6ft closed 50-30mm high quality GRP mast..... **£199.99**
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TMF-2 40ft open 9ft closed 57-30mm high quality GRP mast..... **£349.99**
TMF-3 50ft open 8ft closed 65-23mm high quality GRP mast..... **£399.99**

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Whizz Whip HF/VHF/UHF portable antenna with telescopic whip - ideal for any situation where a long wore or vertical antenna is just not an option - get on air today for **just £99.95**

Whizz Loop 20-60m compact loop is ideal for QRP Transceivers when space is limited or using portable with a Yaesu FT-817ND or similar. Can be used indoors with surprising results and handy for travelling due to its "pocket" size antenna ideal for indoor or out and can be packed away and all for just **£69.95**

Whizz Loop V2 (right) same as above but with a frequency range from 40-10m..... **£79.95**

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GP2500 All Band 80-6M Vertical TX 80-6M RX 2-90MHz, Power 250W Length 7.13M **£199.95**
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GPA-80F fibreglass version of GPA-80 ..... **£129.95**

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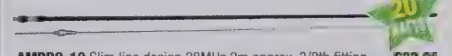
Get great results with the Moonraker range of HF mobiles! From as little as £22.95!



AMPRO-10 Slim line design 28MHz 2m approx. 3/8th fitting..... **£22.95**
AMPRO-11 Slim line design 27MHz 2m approx. 3/8th fitting..... **£22.95**
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AMPRO-15 Slim line design 21MHz 2m approx. 3/8th fitting..... **£22.95**
AMPRO-17 Slim line design 18MHz 2m approx. 3/8th fitting..... **£22.95**
AMPRO-20 Slim line design 14MHz 2m approx. 3/8th fitting..... **£22.95**
AMPRO-30 Slim line design 10MHz 2m approx. 3/8th fitting..... **£22.95**
AMPRO-40 Slim line design 7MHz 2m approx. 3/8th fitting..... **£22.95**
AMPRO-60 Slim line design 5MHz 2m approx. 3/8th fitting..... **£24.95**
AMPRO-80 Slim line design 3.5MHz 2m approx. 3/8th fitting..... **£27.95**
AMPRO-160 Slim line design 1.8MHz 2m approx. 3/8th fitting... **£59.95**

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DPC-W Wire dipole centre with securing clamps **£5.95**
DPC-S Wire dipole centre with SO239 socket for PL259 ..... **£6.95**
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We offer all type of mounting hardware to help get you rigged up at home – if you cant see it listed chances are we have it. Check www.moonraker.eu or just give us a call

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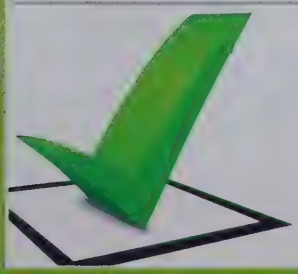
TK-24 wall bracket offers 18" clearance **£29.95**
TK-12 wall bracket offers 12" clearance **£19.95**
BB2 mast base plate to suit up to 2" masts/pole **£22.99**
JOIN-200 clamp 2" poles back to back **£17.95**
PTP-20 2" to 2" mast clamp **£5.95**



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Design Notes

Readers of last month's *Data* column will have seen the suggestion of a 1200 Baud link used to send basic text messages over a good quality VHF FM path to fill in where mobile phone coverage fails at an otherwise 'good' portable site. After writing that, I decided to look into suitable hardware and to try to construct a simple data link. Back in the days when 1200 baud packet radio was popular, there were two modem chips that reigned supreme: the TCM3105 that covered Bell and CCITT standards for 300 and 1200 Baud, and the AM7910 World Modem Chip that covered everything. Needless to say, these days, those devices are obsolete and although they can be found on eBay, they are surplus stock with an uncertain long-term availability and provenance – and are pricey. So, to see what could be done using modern devices, I had a look around – and there is not much there. Most commercial data links nowadays are done with integrated transceiver modules, which although no doubt could be programmed to operate on amateur frequencies, wasn't really what I was after. Perhaps in other circumstances... But not in the spirit of this experiment.

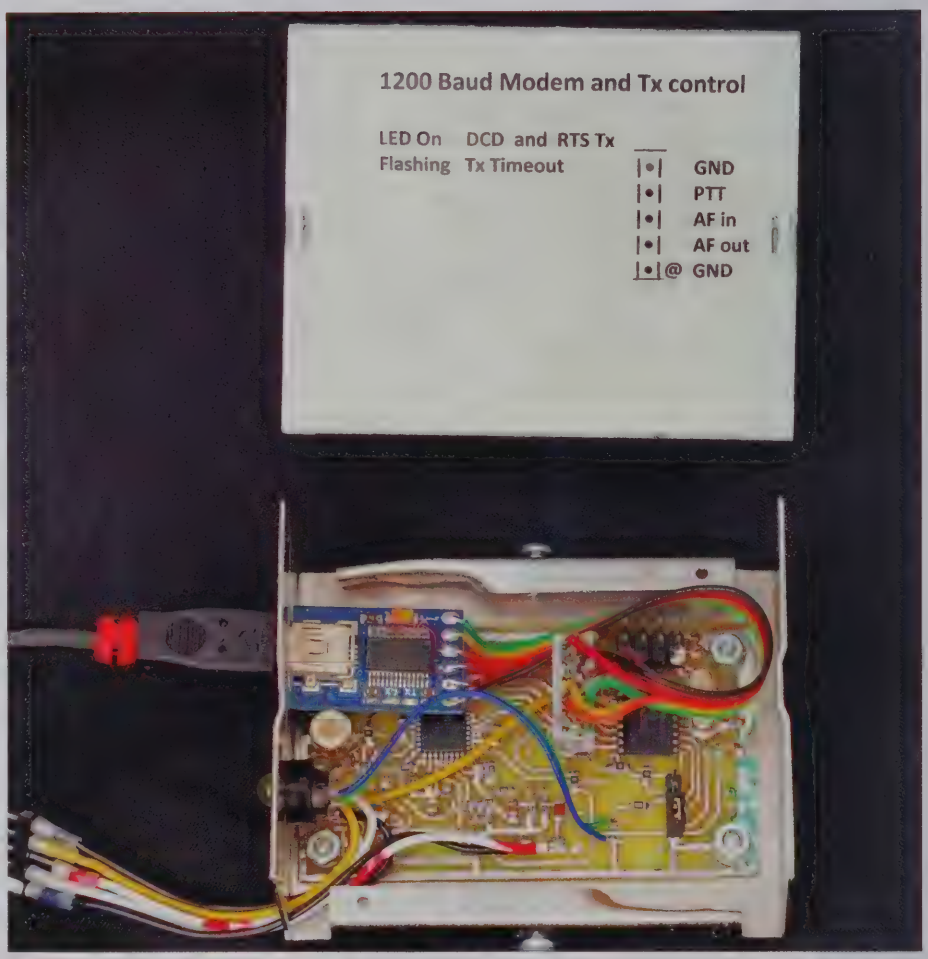

PHOTO 1: HART 1200 baud Modem test module. This unit does not have the extra X11 input gain stage.

HART modem

One item that did appear in all the catalogues, however, was something called a 'HART' modem, that operated using Bell 202 tones at 1200 baud – which is what I was after. Having not heard of the HART protocol, a bit of Googling was needed (other search engines are available!). It turns out this stands for '*Highway Addressable Remote Transducer*' and is just 1200 baud signalling on a twisted pair for industrial automation purposes **[1]**. The tones are superimposed onto a standard instrumentation 4-20mA loop circuit. A well-established subject in their own right, 4-20mA loops have little connection to amateur radio, but well worth a bit of reading, if only for pure interest **[2]**.

As well as plenty of ready-to-go modules, several modem chips seemed readily available **[3]**. Feeling rather lazy, instead of studying the data sheets for all of them looking for the most suitable, I picked one virtually at random, the A5191-1200 device. This looked eminently suitable: it transmitted Bell 202 tones at 1200/2200Hz and could receive and decode them. The data sheet gave a suggested circuit with input filtering suited to the low current consumption and high noise typical of an industrial current loop, so I saw no reason why it wouldn't work on a 2m FM path. One issue spotted though, the transmit waveform was stated as being trapezoidal in shape rather than a sine (this in spite of a block diagram on the data sheet with a stage labelled 'Sine Shaper'). But as this was all just an experiment, more for interest than anything else, making sure the transmitted spectrum was clean would all be part of the fun.

Serial interface

For the purposes of this test, I was only interested in stop-start serial signalling, the sort generated by a standard COM port on a PC. While not best suited to any link where noise may intrude to upset the timing and synchronisation of the decoding process, clean low noise FM should present it with no problems. Whilst the AX25 packet radio standard would have been more suited to a radio link, the effort that would have to go into programming the link protocol instead of using an off the shelf UART just wasn't worth the effort.

An FTDI FT232R USB COM port chip was used for the PC interface. I have used literally dozens of these in the past, and have plenty of spare modules lying about, so each modem had one dropped in. The 5V USB supply was used to power the modem, so no extra supply was needed.

Andy Talbot, G4JNT
andy.g4jnt@gmail.com

Clock generator

The A5191 requires a clock source at 460.8kHz and the datasheet states this can typically be a ceramic resonator. Needless to stay, ceramic resonators at this frequency could not be found anywhere but since 460.8kHz can be derived by dividing 7.3728MHz by 16 and crystals for this frequency are very common, that wasn't an issue. The obvious solution would be a 74HC4060 oscillator divider chip and so some of these devices were ordered at the same time as the modems. But then a lightbulb moment hit; why not use a PIC microcontroller? Although the modem would not, it its own right, need a controller as it would be driven directly from a PC serial port, I might in the future have a need for a microcontroller plus modem for a standalone project. Using a PIC to just deliver a divided version of its clock may appear a bit of overkill, but the component count is a tiny bit lower than the 74HC4060 solution (one resistor less) and only a few pence more in component cost.

Providing a *symmetrical* square wave divided-by-16 version of the clock using a firmware loop in a PIC isn't feasible. It can't be done in less than six machine cycles of the processor clock, which itself is a quarter of the oscillator frequency. Many PIC devices provide a Pulse Width Modulation output as a peripheral, the clock rate for this can be set to $F_{OSC}/16$ and to 50% duty cycle. This fixed PWM output would then be generated independently of any other processor operation, leaving that free for whatever tasks I might dream up.

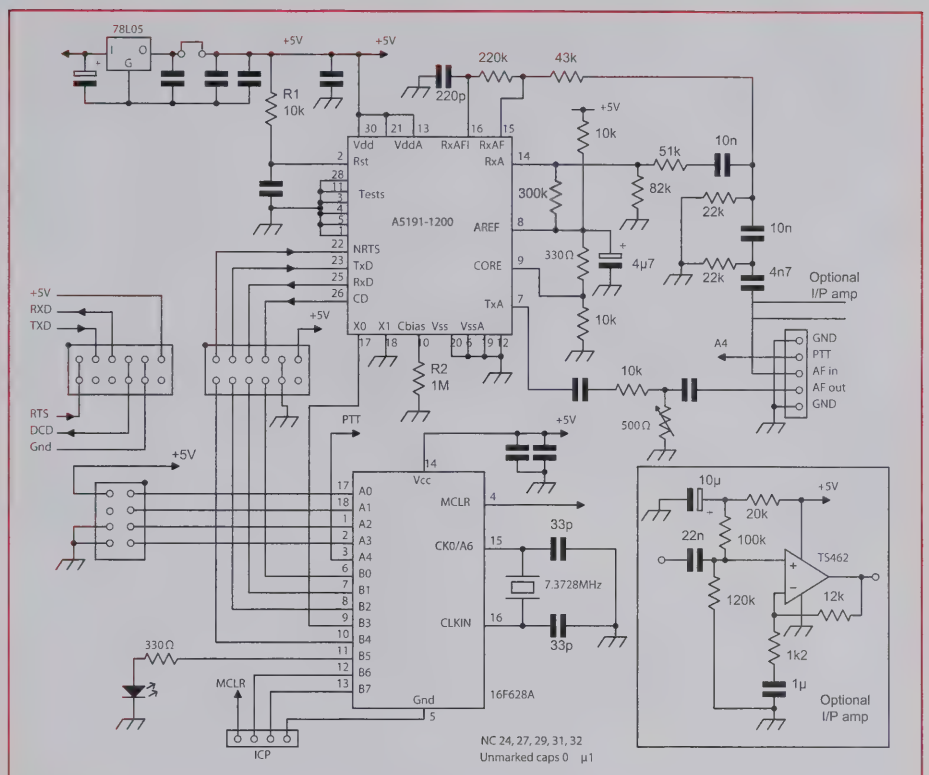

FIGURE 1: Circuit diagram of the HART modem test module.

Modem design

Figure 1 shows the circuit diagram of the test module, constructed on a single sided PCB shown in **Photo 1**. It follows the suggested circuit in the data sheet apart from in one area. The components in the input high pass filter were originally suited to operation at a high operating impedance and used resistors of 220kΩ and 1nF / 470pF. Since current consumption and load impedance are not an issue here, I changed these by a factor of ten to 22kΩ and 10n/4.7nF to keep to more realistic values and make stray pickup less of an issue. One RC pair, those on pins 15 / 16 of the chip, had to stay at the original values as they work with an internal resistor inside the device.

Headers and link positions were provided on the PCB to allow it to be used for any future completely unrelated experiments without having to hack the board around and cut tracks.

Tx/Rx switching and radio interface

The A5191 chip works in simplex mode with the direction of data flow controlled by the Request To Send, or RTS line. The RTS line from the FT232 device controls this directly so the driving PC controls direction of data flow. The radio PTT also needs to be operated in synchronism, to receive, or transmit the generated tones. There is

FIGURE 2: Raw audio output from the A5191 HART modem chip showing the trapezoidal shaped waveform with its high order harmonics.

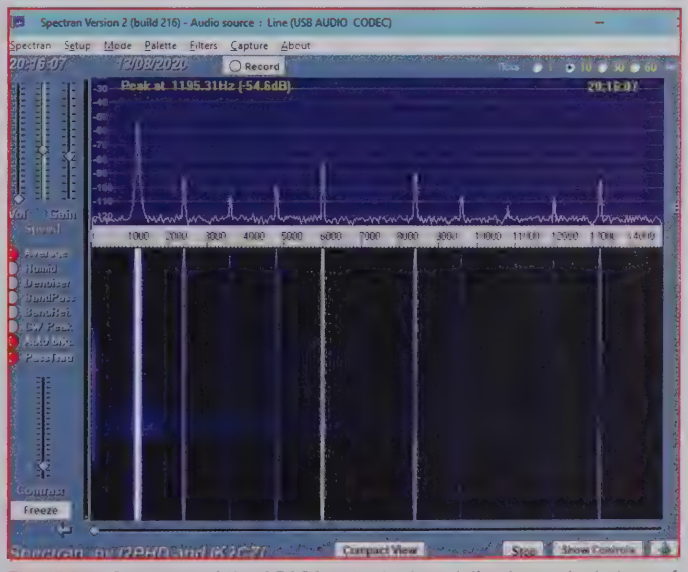

FIGURE 3: Spectrum of the A5191 output when delivering a single tone of 1200Hz.

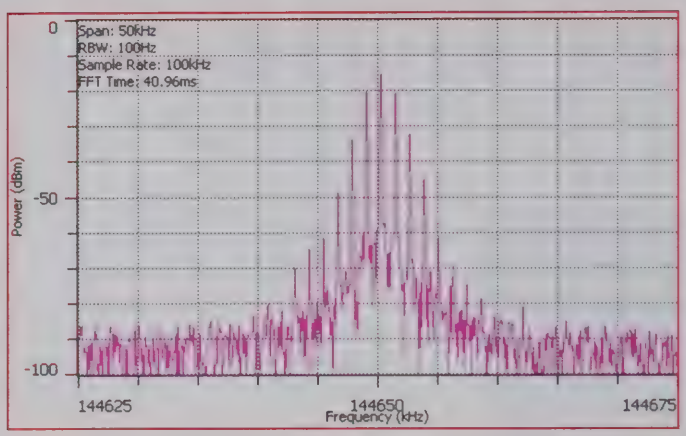

FIGURE 4: RF Spectrum from the Alinco DJ-496 radio when driven with a single tone at 1200Hz.

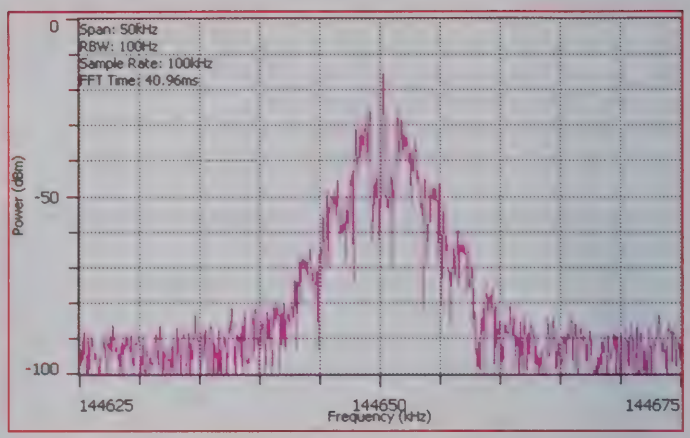

FIGURE 5: RF Spectrum when transmitting a 1200 baud random data stream using the modem waveform shown in Figure 2.

every chance one of these systems will be operating unattended at some stage and, in such circumstances, you must provide an emergency transmitter timeout. This was a useful task for the PIC: it intercepts the RTS line from the UART and an output is used to control the transceiver. If RTS is asserted for longer than a certain length of time (I set this at 5 seconds for now), it times out. The timeout is reset by dropping to receive mode briefly. Finally, to let the PIC do something else useful, it drives a LED that illuminates if either the Carrier Detect (CD) pin of the modem is active or if the radio is in transmit. It flashes rapidly if the transmit timeout is activated.

Interfacing the audio to the radio was a bit of a nightmare. I have two VHF handhelds that will mainly be used here, an Alinco DJ-596 and a Baofeng UV-5RC. Both had headset sockets consisting of 2.5mm and 3.5mm jacks, but the connections to these couldn't be more different. The Alinco used the 2.5mm one for microphone and PTT, using a common line and needing a 10k resistor and 100nF capacitor to separate the two functions. The Baofeng used the 3.5mm for mic and PTT, with its barrel being the PTT line, switched against the barrel of the 2.5mm jack as ground. Different leads had to be made up for each radio. Audio out from the headphone connector with the volume reasonably advanced was more than enough for the modem input. Fortunately, both radios had similar microphone audio level requirements, with about 20mV RMS needed for correct operation so the output from the modem was set using a preset resistor. Since I was reasonably confident the radios would have decent audio filtering before the FM modulators, they were fed with the raw trapezoidal signal.

I also wanted an interface to the Elad FDM-Duo and FT-817 transceivers, both of which provide low level audio outputs, typically around 100–200mV RMS. These were of insufficient amplitude for the A5191, so one of the modems had an extra opamp stage added, providing X11 voltage gain.

Output spectra

Confidence that the radios had sufficient audio input filtering before the FM modulator proved to be justified. **Figure 2** shows the raw trapezoidal waveform generated by the A5191 modulated with a 1200 baud signal. The sharp edges mean it is rich in high-order harmonics as can be seen in the spectrum of a single 1200Hz tone in **Figure 3**. After applying this to the microphone input of the Alinco handheld, the resulting transmit RF spectrum can be seen in **Figure 4**. It is nicely contained within the 12.5kHz channel and no artefacts of the high order audio harmonics appear to be making their way out.

Next stages

At the time of writing, two radios connected to two modems and PCs, using dummy loads with RF leakage adjusted for a reasonably quieting 'smooth noise', will communicate across the room with an arbitrarily low error rate. I haven't as yet tried out a long distance or mobile test. To do this and to prove my original ideas means that software needs to be written for auto responding, a periodic beacon transmission, linking to the KST chat system, adding checksum / error detection and more. Whether all that is a subject for this column or for *Data* remains to be seen.

USB host for serial ports

An interesting comment seen on one of the Chat Groups went along the lines of "... I've got a serial interface for the Elad-FDM Duo so I can control it from an Arduino ...". Which was a bit odd. The FDM-Duo has an internal USB COM port used for CAT commands and Tx/Rx control via the RTS line, so what was this serial interface doing? In fact, the FDM-Duo appears to be almost unique in not having a 'real' CAT port; a matter that is more than a bit inconvenient for those of us who may want to control it from other than a PC or microcomputer with a USB host capability. The answer turned out to be almost surreal. It seems this problem is not unique to the Elad radios. Other types of equipment like GPS receivers and music hardware have internal COM ports, accessible only via a USB interface. A lot of people want to be able to get at these COM port from simple controllers like Arduinos, PICs and Raspberry Pis.

It turns out that the unit described is a USB Host module, itself an Arduino, onto which the user loads software for serial commands and drives / controls it from the serial port. One example is that in [4], the website states: "You might think it a little strange that the chip in the device is converting serial to USB, then we are converting it back to serial again. Well yes, that is true. You could simply open up the unit and gain access to the serial connection directly and that may well be the easiest and cheapest option. But if you don't want to modify the unit (and void the warranty), or if you want data from it at a different baud rate (eg USB GPS runs at 4800 baud, but you want serial data at 9600 baud), then this USB Host board and the software is what you need."

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[2] 4-20mA: www.predig.com/indicatorpage/back-basics-fundamentals-4-20-ma-current-loops
[3] HART modem chips: https://uk.farnell.com/search?st=hart%20modem
[4] USB Host module for embedded COM ports: www.hobbytronics.co.uk/usb-host/usb-host-serial

RSGB SHOP

Transmission Lines Explained

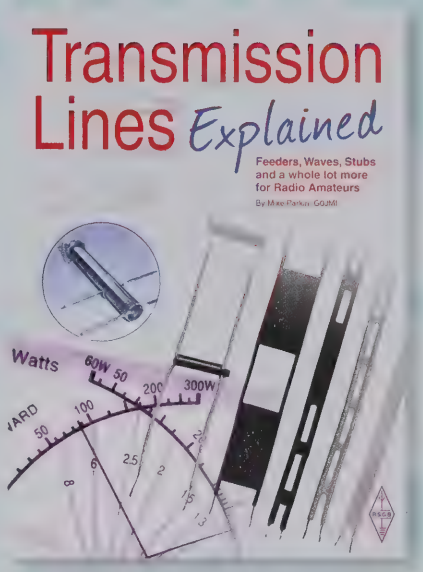
Feeders, Waves, Stubs and a whole lot more for Radio Amateurs

By Mike Parkin, G0JMI

Getting the signal from your radio to the antenna is a vital component of any radio setup but few understand the full impact their feeder is having. This is where *Transmission Lines Explained* steps in providing through descriptions and techniques rather than mathematics the theory involved.

The aim of this book has been to provide an understanding of the theory, operation and use of transmission lines where twin-line cable or coaxial cables are used, not only as antenna feeder cables, but also as a basis for the matching arrangement between a line and its load. Broken down into logical sections *Transmission Lines Explained* covers twin-line and coaxial cable transmission line types, including examples of how transmission lines can be constructed to suit particular applications. Techniques are included to summarise how coaxial cables can be fitted with connectors, including BNC, N and PL259 types. There is a section covering the use of the Smith Chart where the effect of a mismatched load on a transmission line is described through several practical examples.

Transmission Lines Explained is the ideal compilation of techniques, descriptions and examples, giving an understanding of the concepts associated with transmission lines.



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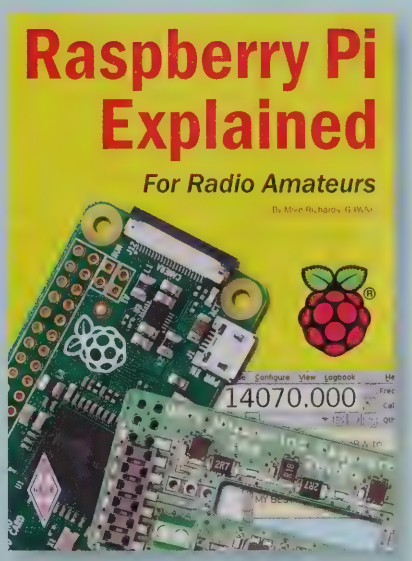
RASPBERRY PI EXPLAINED for Radio Amateurs

By Mike Richards, G4WNC

The Raspberry Pi series of low-cost single-board computers were developed to promote teaching of basic computer science in schools. However, they have become extremely popular and are selling well outside the original target market including in Amateur Radio. Well known expert Mike Richards, G4WNC sets out in *Raspberry Pi Explained* to provide the basics of the Raspberry Pi, alongside making them work in an amateur radio context.

Raspberry Pi Explained guides you through step-by-step instructions to get the Pi working for you. Once you've learnt the basics, *Raspberry Pi Explained* is packed with comprehensive details of the Pi hardware and Linux operating system, including all those hard-learnt tips and tricks you need to make the most of the Pi. Mike also guides you through the installation of many of the popular radio related software packages. Readers will find detail of using WSPR, Dire Wolf, FLDIGI, WSJT-X on a PI alongside Software Defined Radio (SDR) applications such as GQRX, Linrad, Quisk to name just a few. Those without a working knowledge of the Raspberry Pi are not forgotten and they will still find *Raspberry Pi Explained* a vital reference that is packed with tips, advice, projects, programming and much more.

Raspberry Pi Explained is aimed at the beginner through to the experienced. So if you are considering using a Raspberry Pi for Amateur Radio but don't know where to start or perhaps you already have a Raspberry Pi and need help to getting going, then this is the book for you!



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IARU HF World Championships 2020

In a typical year, the RSGB HQ Station, GR2HQ, participates in the IARU HF World Championships Contest. Not this year.

The IARU HF World Championships Contest is an annual 24-hour CW and SSB, 6-band event that is held on the second weekend in July. As part of the contest, IARU member society headquarters (HQ) stations are activated around the world. Each HQ station is permitted one transmitted signal per band and mode. All entrants accumulate QSO points by contacting HQ stations on each band and mode, plus a multiplier for each HQ station contacted per band; this is only part of the scoring but explains the significance of the HQ stations. The HQ stations also compete with each other and this is a hotly contested part of the contest.

In a typical year, there may be more than 50 HQ stations active, many of whom will have twelve separate stations using the same callsign for the 24-hour period. The highest scoring HQs will have teams of amateurs sharing the operating on each band and mode with a total QSO count of between 10,000 and 20,000.

We would normally have around thirty RSGB Members participating in one way or another. The teams would often have technical preparation to do together but also some time for socialising – a pleasant contrast to some of the solitary aspects of the hobby.

Antennas at the ready at Richard, GW4BVJ's home.

2020 plans

2020 has not been a typical year; the IARU Contest was a very different experience for the RSGB HQ Station GR2HQ due to the Covid-19 restrictions in the UK.

At the end of March, it was clear that the usual model of host stations and visiting operators would be inappropriate. We contacted those who had participated in recent years to see who would be willing to take part on a 'single-operator home-station' basis. We had enough volunteers to make the decision to go ahead but we knew that we would need to recruit some newcomers and some previous participants to make a full team.

The knock-on effects of having more distributed RSGB Member stations involved included a need for slightly more coordination than we would normally anticipate and some additional training too, as there would be no opportunity for on-site learning in the operating teams. Tim, G4FJK joined Chris, GM3WOJ and Nick, G4FAL to carry out the initial planning and recruitment (online, of course).

To find the number of operators that we would need, we asked for help from RSGB Contest Club members, from members of the UKHF Contesting discussion group and we also made personal approaches to contesters with whom we had operated previously.

A simple survey

To help in the planning process we asked everyone who had been involved before or who volunteered to join for the first time, to complete a simple survey:

- Can you help for 12 hours or 24 hours?
- Where is your QTH?
- Can you operate using CW, SSB or both?
- Are there bands that you are best equipped to operate on?
- What radio equipment and aerials can you have available?

Chris, G0DWV preparing a Yagi for operations in Norfolk.

Duncan, G3WZD has a quiet rural location in Somerset.

- Would you prefer to transmit or be a receiving partner?

From the survey results, we assembled a Band/Mode Plan showing each operator allocated to a particular band and mode, some transmitting and others as receiving partners (I'll explain that later), but including secondary allocations so that people could have variety over the 24 hour period. We sent the plan to everyone involved and made some amendments. We could see that we would have a combination of 'big gun' and 'little pistol' stations and a wide range of experience in the team.

Our full list of operators/partners in 2020 was G0DVJ, G0DWV, G0MDR, G3WPH, G3WZD, G3XLG, G3YYD, G4BYG, G4CLA, G4DRS, G4FAL, G4FJK, G4KNO, G4KZD, G4MEM, G4MJS, G4NVR, G4PIQ, G4PVM, G4RCD, G4WQI, G6MC, GM3WOJ, GM4XYI, GM7VSB, GW0ETF, GW0GEI, GW4BVJ, M0BEW, M0BPQ, M0IEP, M0NKR, M0VKY, M0HDF, M0LTE, M5ET, MM0GKB and MM0GPZ.

TABLE 1: Scores (before adjudication).

Band	CW Qs	Ph Qs	Zones	HQ Mults
160	358	122	12	32
80	1,017	752	23	41
40	1,565	1,500	36	45
20	2,230	2,722	49	55
15	1,336	814	37	42
10	965	722	21	33
Total:	7,471	6,632	178	248
Total Score 18,870,522				

In practice

Partnering is a powerful tool that we have been using for many years in the GR2HQ team but this year it came into its own because we had far more operators distributed around the UK and, when not operating, they could help by acting as remote receiving stations. Put simply, partnering means that while one person is running a frequency (soliciting QSOs) others can be listening for callers and feeding callsigns to the run operator. And not only that, when things are busy, it is extremely useful to have someone who can check for valuable multiplier stations on the particular band/mode and can alert the run operator to leave their run frequency to go and call them. Due to the scoring regime in this contest, finding and working new multipliers is very important and part of the fun is scouring the band to make sure none of these get away.

We used the popular Win-Test contest logging package with one or more computers active at each receiving or transmitting station. All were interconnected via a central server but the logging database was distributed such that every QSO made was seen and recorded in a local logfile by all other networked stations. The package includes a text-message style communication system so that short messages can be broadcast to all other stations or sent to an individual station. Thanks to Pete, G4CLA for putting the network together and for being available to troubleshoot during the contest.

We also used a private cluster system so that any callsigns that we spotted would be retained within the team, thanks to Andy, G4PIQ.

RSGB Contest Club

The RSGB Contest Club made a couple of valuable contributions to GR2HQ: firstly in the context of Covid-19 Ofcom were very helpful in agreeing for us to have a single NoV with the understanding that any Full licensed Contest Club member could operate during the contest using GR2HQ providing only one station was active per band/mode; secondly, we were able to use one of our club callsigns G*6XX in our training sessions.

With so many stations on the network we saw the value of having an independent means to communicate between team members and John, M5ET set up an online chat room using the Discord instant messaging application, which allowed those who were not operating to discuss strategy during the contest.

How did the contest pan out?

To give a feel for the contest experience here are just a few comments from team members:

160 CW: The big plusses were having

Nick Totterdell G4FAL,
RSGB HF Contest Committee Chair
HFCC.Chair@rsgbcc.org

Rich, GW4BVJ is based in in Carmarthenshire, Wales.

This is what the Yagi looks like at Chris, G0DWV's home.

The Triband Yagi at Nick, G4FAL's home.

more participant stations and more flexibility. There were some minuses – not being able to engage our young contesters as would normally happen and the social aspect of hosting or visiting other people's stations was also missed.

160 SSB: Rich, GW4BVJ started on 160m SSB and knew he needed to have the propagation on his side with low power, he appreciated the first call from Ian, G3WVG as it proved he was getting out.

80 SSB: The main SSB effort was Neil, G6MC, ably assisted remotely by Vic, G4BYG and the two Marks G4MEM and G4RCD who formed a sort of virtual bubble and just got on with it. All started well for Neil, then at around 2330 one amp tripped out, the dipole antenna had failed, so just the 4 square to run with. A pain at any time but with Neil being the fixer and operator this meant some downtime. The problem? Well, had they some more power then they might at least of benefited from the cooked lamb that had chomped through the coax!

40 SSB: There were slow times, mad times and all in all Ray, G3XLG and Chris, G0DWV say that they did OK. They were chasing down the 40CW guys' total and almost had them – only beaten by 3 QSOs at the line. They were astounded by the speedy Partner who turned up in the last hour, with the calls appearing before the caller had finished speaking. It turned out to be Andy, G4PIQ, though still not quite enough to beat the CW team.

15 CW: They made 1,300 QSOs and worked more higher point contacts in the Americas and Asia than were expected. There was no North America on Sunday apart from FM, but they did have a good number on Saturday. A number of JAs were worked but the JA HQ station failed to hear their calls.

10 CW & SSB: The 10m team was made up of seven stations across the UK, two in southern-GM, two in the North of G, one GW and two in the Southwest, and were kept busy for most of the 24hrs. "Discord" was used continuously to coordinate and control who should be the "Run-station" on either CW or SSB.

The band was open with Es propagation for about 18 of the 24 hours, and they were pleased to make 244 QSOs into the USA and Canada, finding many weak NA signals to work on CW late into the night.

Because of the nature of Es propagation, a team-member at one end of the country would often have a completely different queue of stations to work, compared to another maybe 600km away.

Six of the seven sites were running QRO with antennas ranging from a 10m 8-ele Yagi at one site, a 10m 6-ele at another, to smaller Yagis and Tribanders.

Claimed Score

Our score before adjudication is 18,870,522 points, made up as shown in **Table 1**.

Given that some of the bigger HQ stations were not subject to Covid-19 restrictions we will be pleased if we achieve a top-ten finish after adjudication.

Future

2020 GR2HQ will stay in our memories as the Covid-19 contest. The setup of the team and our methods were driven by the virus and one or more of us were fighting the infection during the contest.

For 2021, do we want things to go back to normal? The answer is yes and no. Yes, we want to have host stations where those who do not have a competitive home set-up can join teams to operate on particular bands and modes – we particularly missed our younger contesters in 2020. No, we found it a great strength to have more people engaged in operating and in partnering those who were operating and want to continue with more home stations active in the future.

If you are keen on contesting and would like to join in a team event in 2021 on behalf of RSGB please email ContestClub@rsgbcc.org.

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Teensy
SWR / power meter

Introduction

I had been playing with a 'tandem power coupler' described in the *ARRL Handbook* (2017) and it struck me that this could be the basis of a nice digital SWR / power meter project to occupy me in retirement. My first unit used a two-line LCD display and Arduino microcontroller, later moving on to a TFT display and now to a Teensy 3.2 microcontroller.

This project uses a Teensy 3.2 microcontroller (costing about £17) and a ILI9341 touch screen, 320x240 pixel, 2.8" TFT colour display (about £8). I added a buck voltage regulator (£4) to give 5V from a 13.8V DC supply. (The Teensy and TFT display both have 3.3V components, but both also have internal 5V to 3.3V regulators). A few extra components: connectors, ferrites, stripboard, die cast boxes and bezel brought the total cost to about £50. The meter has a USB connector so that it can be easily programmed.

Since the meter is totally software driven, it can be used as a basic SWR / power meter, or can have added functionality such as control of my Icom IC-7300 using C-IV commands. (My current unit includes control of my IC-7300, tuner activation based on receive frequency, automatic cycling between FT8 bands, Tx power switch, etc. This software is also available on request.) However, since not everyone has the Icom radio, this article will describe the basic SWR / power meter.

PHOTO 1: General view of the Teensy power meter in operation. A good quality aluminium enclosure and a proper display bezel provide a professional finish.

Teensy

The Teensy devices are like Arduinos on steroids and are code compatible, using C / C++ code. The Teensy 3.2 has a 16-bit ADC with multiple channels suitable for high speed simultaneous sampling. The Teensy also allows for simple setup of an interrupt timer, discussed later, which here is used to trigger the raw ADC measurements at fixed intervals.

Arduino / Teensy software is developed on a PC using the Arduino integrated development environment (IDE) with the add-on Teensyduino software. Alternatively – and much preferred for development, but with a learning curve – is Microsoft Visual Studio (free for personal use) plus Visual Micro Extension, which has the huge advantage of a built-in debugger. Both environments allow easy upload via USB to the Teensy. Standard libraries are used for the display, touch screen, analogue to digital converter (ADC), fonts and EEPROM, with most installed by default. Any missing will show at compilation and are easily found on the internet. The fonts library will have to be downloaded and installed.

The software source for the SWR / power meter is free for non-commercial use and available from the author on request; feedback and comments would be appreciated. I don't propose to describe the software in detail as there are over 2000 lines of code and comments. It is written without complicated programming constructs and is fairly well self-documented. I'm not a programmer, so I expect that the code could be a lot more efficient and better presented. I will describe the basic design and some of the main problem areas.

Screen layout

The software effectively splits the display screen into discrete display / touch areas – 'frames' or 'buttons. These frames display the

Roger Mawhinney, GI8GZM
gi8gzm@gmail.com

TABLE 1: Frames / buttons actions.

Frame / button	Normal	Short touch	Long touch
NetPower	Net power in watts (forward power–reflected power)	Power in dBm	–
PEP	Peak envelope power (watts) measured at 5kHz	Peak average power, 3-4s hold	Calibration mode
SWR	SWR (to one decimal place)	SWR (to two decimal places)	Reset options to default & reboot
Meters	Power + peak indicator SWR meter	Swap meter positions	–
Average	Current averaging	Cycles through three averaging options	Averaging & weighting options

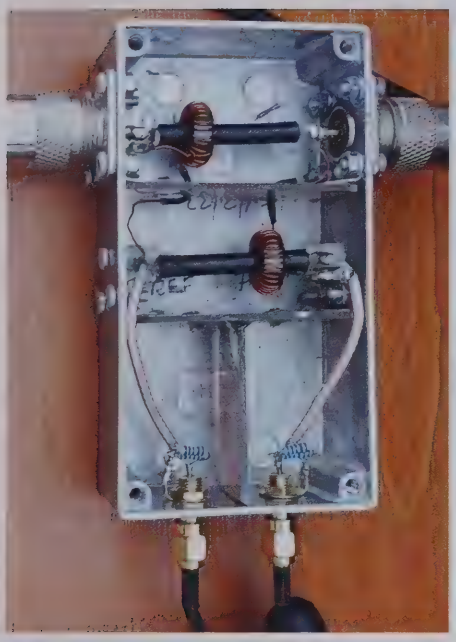


PHOTO 2: Inside the dual directional coupler.

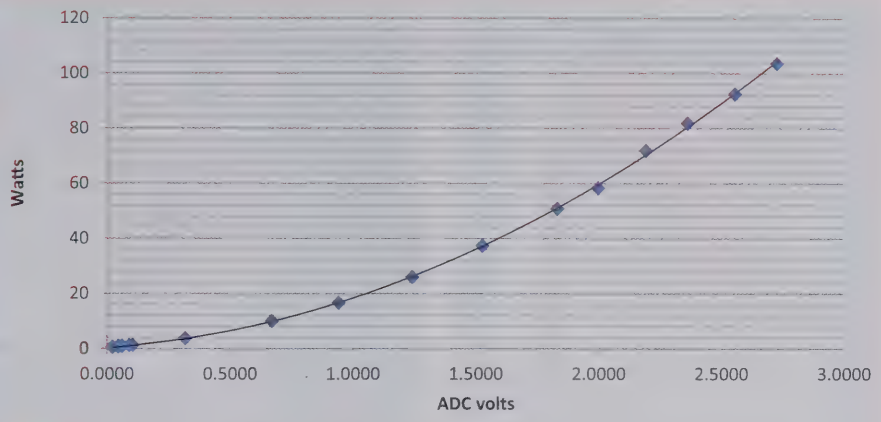


FIGURE 1: Excel graph of watts/ADC volts for ADC voltages above 0.01V (powers above about 0.5W).

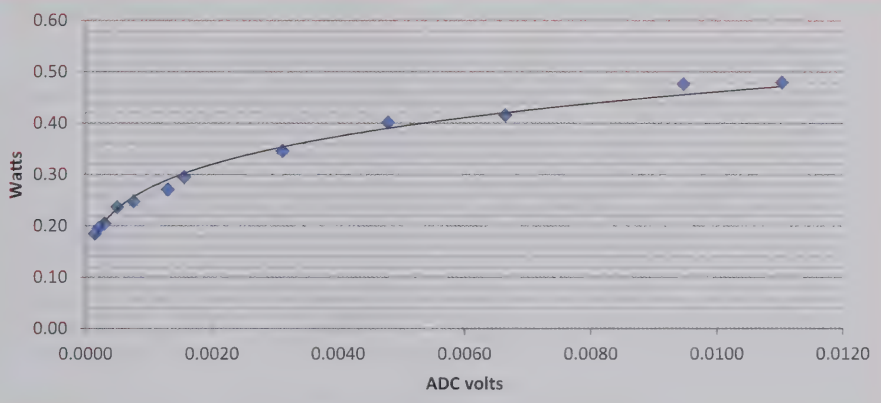


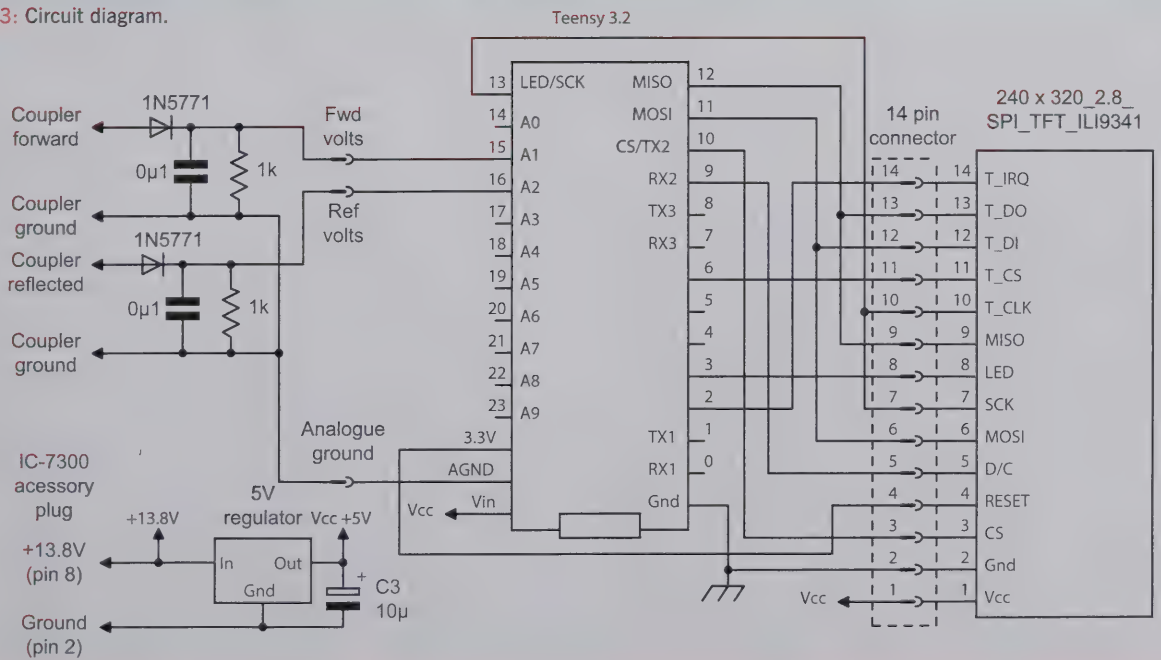
FIGURE 2: Excel graph of watts/ADC volts for ADC voltages below 0.015V (powers below about 0.5W).

data and act as touch inputs to the Teensy controller. This allows for flexible layout as the sizes, positions, colour, text, etc. are defined in data and not hard coded. Most of the buttons have dual functions described in the **Table 1**. Buttons respond to short or long touch, generally toggling between actions.

Main loop

In operation, the meter software loops continuously, sampling the forward and reverse input voltages and displaying the results on the meter. Net power can be displayed in watts or dBm. Average peak power and peak envelope power (PEP) are also displayed. SWR is calculated from the forward and reflected power. In the basic form

FIGURE 3: Circuit diagram.



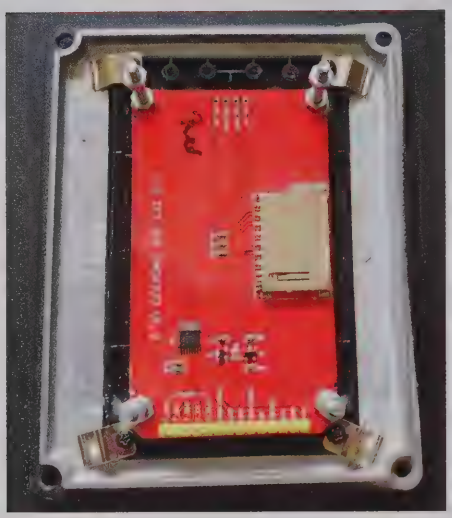


PHOTO 3: Display bezel and display. The spring clips mean no visible screws on the front panel.

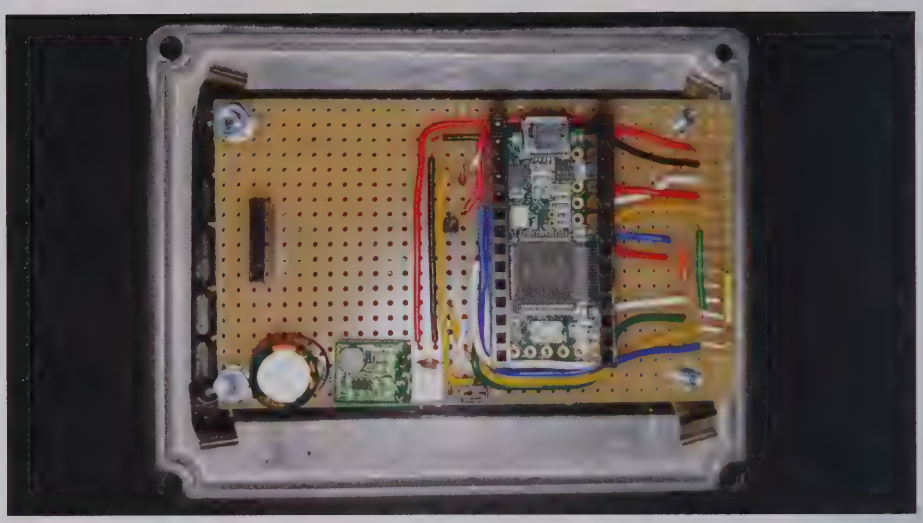


PHOTO 4: The stripboard that carries the modules is mounted behind the display. A small sub-module (not shown) plugs into the socket to the left.

of the meter, bar graphs are used to display power, peak power and SWR. The sampling is fast, so the results are averaged to ensure a readable display. Options are available to adjust the averaging, and a 'button' can switch quickly between three settings – this should suit most operators. I have added exponential smoothing as an experiment and this can be adjusted via the Options screen.

In this meter, the Teensy is sampling about 5000 times a second (nearly twice the maximum audio frequency used for voice communications) and performing quite complex floating point calculations. This is fast enough to sample peaks in a SSB transmission and allows peak envelope power to be calculated.

Display refresh

Using the TFT display with an Arduino/Teensy has a problem in that data cannot be changed by simply overwriting the previous data; it must be cleared prior to rewriting. The simplest method, blanking the entire screen and rewriting, is slow and leads to unacceptable flickering. Even clearing a data field / frame and rewriting leads to flicker of that displayed data. I elected to write the static frame data – outline, text, etc – as an initialisation and only refresh when the layout changes, eg switching to Calibrate mode. Changing actual data is achieved by scanning the data string from left to right then blanking and rewriting only the changed data. For example, if forward voltage changed from 1.2345 to 1.2356, only the last two of the six characters would be refreshed.

I decided to a use a proportional font (as it looks so much better than the fixed-spacing Courier) but this creates its own set of problems in that characters have varying widths and hence screen positions. The display functions are worth studying to understand this data blank/rewrite, especially with a proportional font.

The power and SWR meters use a similar approach – the scales are initialised once and the 'bar' indicators are used to display the data. For aesthetic reasons I have used a graduated 'bar' display; this is slow to draw on the display so it is especially important for speed and flicker to refresh only the portions that have changed.

Even though data is averaged at measurement time, I have added extra signal processing for display. This gives a fast attack, exponential decay and short hold times, making SSB and CW signals more aesthetic and visually informative by improving both the text display and meter.

Interrupt timer

The Teensy has the facility for simple setup of an interrupt timer. This is used to trigger the ADC measurement cycle at fixed intervals – I have used 200μs, giving a sample rate of 5kHz. In use, this interrupts any other routines and jumps to the interrupt code. Once the interrupt code has completed, the processor return to its previous operations.

The interrupt routine triggers the ADC to simultaneously sample the forward and reflected voltage from the coupler. These values are converted to floating point voltage measurements. To average the data, they are stored in circular buffers (which reduce noise and stabilise the display), but excessive buffering can lead to overly slow responses. Options can be set to use more or less of the buffer space – this sets the averaging to fast, medium or slow. Fast response would be best for CW, medium for SSB and calibration is slowest for best accuracy. At the same time, peak reading are stored; given the sampling speed, this will detect peaks of just over 200μs and is used for peak envelope power. These data, average and peak, are continuously updated at the interrupt frequency (5kHz) and are available for the other routines to read so they can calculate and display average power, SWR and peak power etc.

Power measurement

The directional power coupler is well described in many places so I'm not elaborating on this here. Essentially the coupler outputs low level AC signals representing instantaneous forward and reflected power. Each signal is rectified by a Schottky diode (chosen for the low forward voltage drop) to give a voltage representative of forward and reflected power, referenced to 50Ω. With any diode, output is highly non-linear for low input voltages, typically below the diode's forward voltage drop (~0.7V for normal silicon diodes). The lower voltage drop of the Schottky diode, typically 0.2-0.4V, means the non-linearity affects only a much smaller power range. But it is worth remembering that such low voltages may well be present, particularly on the reflected power side when operating into a good match with low SWR. My design samples the diode output with the Teensy ADC and compensates for the non-linearity using software.

My maximum Tx output, into a 50Ω load, is about 104W, or 72V_{rms}. The coupler has 24 turns on each of the transformers (FT50-43 ferrite cores). At 100W, this gives an output of about 7.9V_{p-p} When half wave rectified and filtered with a 1k resistor and capacitor (0.1μF), this gives about 2.7V_{dc} at the ADC input. The ADC has a maximum input voltage of 3.3V; this would allow the meter's maximum power to be up to 150W. It is assumed both forward and reflected analogue inputs have identical characteristics.

An issue with the Teensy ADC is low-level noise. This tends to cause readings to have a varying zero offset of about 5mV (possibly due to charging of ADC internal capacitance) – quite enough to give inaccurate readings at low power. A low value resistor (1k) in the rectifier / filter across the ADC input lowers the source impedance sufficiently to reduce the offset to almost zero. The 3.2 ADC has a choice of resolutions. If 12 bit resolution was used, the least significant bit represents 0.8mV – and, surprisingly, this

represents about 0.45W. That could lead to significant errors (eg the difference between 1.4 and 1.6:1 SWR at 10W). I have therefore chosen to go with 16 bit resolution, which has a theoretical resolution to 50μV. (We don't actually get 16 bit resolution due to noise issues but the 13 or 14 actual significant bits help significantly improve accuracy on low power readings).

Power calculation

Every ADC sample provides four integer numbers, representing forward and reflected power and peak powers. This raw ADC output is converted to a floating-point voltage that depends on the ADC internal reference voltage and the resolution. These voltages are displayed in Calibrate mode, which is used to derive software formulae calibration constants to calculate the corresponding power. In normal use, the four measured coupler voltages are averaged and converted to power using the formulae derived from the calibration. Net power is simply the difference between forward power and reflected power; similarly for peak power. There is an option to display power as dBm.

SWR is calculated from forward and reflected power since they have been linearised by the software, using the well-known calculation

$$SWR = \frac{1+\sqrt{\frac{\text{reverse power}}{\text{forward power}}}}{1-\sqrt{\frac{\text{reverse power}}{\text{forward power}}}}$$

Calibration

In Calibrate mode, for a range of TX power settings, I measured the transmitter output V_{rms} voltage at a dummy load on an oscilloscope and the corresponding Teensy ADC forward voltage. Using Microsoft Excel, I calculated the power based on the transmitter RMS voltage

$$P = \frac{V_{rms}^2}{50}$$

Calculated power (W) vs forward voltage were plotted using Excel and two scatter graphs (**Figure 1** and **Figure 2**) were made with Excel's curve fitting function option. These were for high and low power, with a split at about 0.015V. Formulae and constants were derived so that the Teensy could calculate the power (watts) from the measured ADC voltage. At high power (>0.5W) the curve follows the usual watts vs volts square law; at low power, the curve is a power function. The exact curves for any particular coupler will vary depending on the coupler construction, diode and filter impedance.

The expression for the high power operating region (Figure 1) is of the form

$$P = aV^2 + bV + c$$

Excel calculated values for a, b and c from my data and the resulting expression was

$$P = 11.705 \times V^2 + 6.2294 \times V + 0.4621$$

So if the voltage measured by the ADC is 0.6V,

$$P = 11.705 \times 0.5^2 + 6.2294 \times 0.5 + 0.4621$$
$$= 6.5W$$

For the lower power section of the curve (Figure 2),

$$P = a \times V^b$$

Excel calculated a as 1.318 and b as 0.2279, so for a measured voltage of 0.05V,

$$P = 1.318 \times 0.05^{0.2279}$$
$$= 0.069W$$

The software switches between these two equations as appropriate as the ADC voltage rises and falls.

Construction

The dual directional coupler is a standard construction that has been well described before. **Photo 2** gives a general view of it. Reflected voltages at low SWR and / or low power are very small and can be masked by stray fields, so care should be taken to make the construction well shielded and as symmetrical as possible. I chose to connect to the meter using short SMA patch leads.

A bezel to suit the TFT screen was sourced, which gave a very professional-looking finish but had to be modified so that the display board / main board assembly could be screwed to it. A drill and epoxy resin are useful here! The entire assembly was mounted in diecast aluminium box of 120 x 90 x 55mm. I cut the aperture for the bezel (see Photo 1) using my router but the bezel itself conceals any slightly wonky cutting.

Photo 3 shows the rear view of the front panel with the display mounted on the bezel.

The meter circuit (**Figure 3**) has very few components and these are mounted on a piece of strip board that has the same physical dimensions as the TFT display board. The display board has a header row of 14 pins and a corresponding header socket is mounted to the underside of the main stripboard. This allows the main board to piggyback on the display, leading to a compact construction that doesn't require any unsightly screw heads.

The Teensy microcontroller board is mounted on the strip board using 14 pin headers to allow easy change between Teensy devices. The small buck voltage regulator is also mounted on the stripboard, using a keyed power plug. The few extra components are the diodes and filtering resistors and capacitors. These were mounted on a small additional board to make experimentation simpler. This plugs onto the main board with a 4 pin header, seen to the left of **Photo 4**. To complete the meter board, I have a few other connections for C-IV interface and test purposes. The stripboard was wired by hand and is quite simple to complete. There is quite a bit of 'real estate' left that could be used for other purposes, should you desire.

I included a short chassis mounted USB cable so that I could program the meter without having to open the box. The coupler is connected using chassis mount SMA sockets. Power input is 13.8V, taken from the accessory socket on my Icom IC-7300. All connecting leads (including the SMA leads to the coupler head) have clip-on ferrites both ends.

Conclusion

Hopefully, you will try this project. Experience with an Arduino / Teensy would be useful. I am happy to help via email – you'll need to contact me anyway for the software. Any constructive feedback would also be welcome.

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Si5351A frequency generator

Introduction

The Silicon Labs Si5351A is a £1 clock generator chip that, controlled by a microcontroller, is ideal for a VFO or signal source from 5kHz to 225MHz. In this article I discuss the chip and describe a circuit that can generate three clocks. These can be used as a signal generator or to drive an image-cancelling direct conversion receiver or transceiver. It can be used with an LCD display and rotary encoder, or it can be used to generate fixed frequencies read from the ATtiny85 microcontroller's EEPROM.

This is a surface mount project but do not be put off by this. With a magnifier, decent soldering iron and care this is not hard. However, if you are not willing to try surface mount you can use one of the ready built Si5351A modules along with a DIP version of the microcontroller and still use the same software.

Si5351A

There are several versions of the Si5351A, having up to eight outputs. Here we are using the Si3551A-B-GT, which has three clock outputs and comes in a 10-pin MSOP package. Like so many useful modern chips there is no DIP version available. It is connected to the ATtiny85 by an I²C bus. The output is a 3.3V peak-to-peak square wave.

Silicon Labs' application note AN619 describes how to program the chip's registers to generate a frequency. It can be confusing as it describes all the variants, so here I summarise how it is used in this project.

The block diagram is shown in **Figure 1**. The chip contains a crystal oscillator (here at 25MHz) followed by two synthesis stages and an output stage. The first synthesis stage uses a PLL to multiply the input to a high frequency intermediate clock between 600MHz and 900MHz. The second synthesis stage divides this down to the desired output frequency. The output stage contains additional integer dividers for generating frequencies below about 1MHz.

The ratios for the two synthesis stages are both fractional and are expressed in the form $a+\frac{b}{c}$. The first synthesis stage uses a ratio between 15 and $90+\frac{1}{(2^{20})-1}$.

The second synthesis stage uses ratios of 4, 6, 8 or any number between $8+\frac{1}{(2^{20})-1}$ and $900+\frac{0}{1}$. The final output stage R dividers are 1, 2, 4, 8 ... 128.

The Si5351A datasheet specifies a frequency range of 2.5kHz to 200MHz but the lowest frequency is not possible with a 25MHz crystal. We set an upper limit of 225MHz (which is the highest frequency possible from a 900MHz intermediate clock), although it is above the specified range. In practice the intermediate clock can go higher than 900MHz to generate even higher output frequencies, although these will probably be poorer quality (eg increased phase noise).

For the best jitter performance, the datasheet recommends setting the second stage divider to an even integer. So to generate a frequency we start by choosing this divider and then setting the first synthesis stage to generate the correct intermediate clock.

For example, to generate 14.123456MHz we choose a second stage divider of 60. This means we need the intermediate clock to be 14.123456 x 60 = 847.40736MHz. Suppose the crystal oscillator is running at 25.000123MHz. We set the first stage synthesis ratio to be $33+\frac{939657}{(2^{20})-1}$, giving an output at 14.12345599Hz.

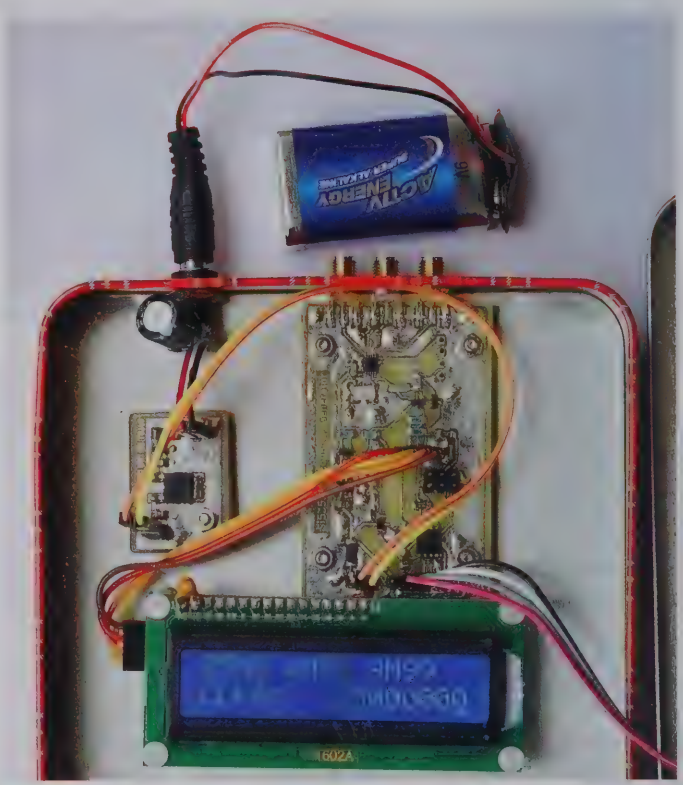


PHOTO 1: The completed prototype, housed in a small tin. The rotary controller is fixed in the lid, out of shot to the right.

Note that the denominator (c) can be any number up to 1048575 (which is 2^{21}-1) and the software makes use of this to avoid using floating point arithmetic.

Quadrature

An image cancelling direct conversion receiver requires two clocks in quadrature, ie 90° out of phase. This is often achieved by using a clock at 4x the required frequency that is then divided down by a pair of flip-flops, but the Si5351A can directly generate two clocks with the required phase shift. This is done by setting the phase offset register to the same value as the second stage divider. As this is a 7-bit register it means that the maximum divider (an even integer) is limited to 126, which gives the lowest frequency as 600MHz/126=4.762MHz, so

Richard Tomlinson, G4TGJ
rpt@rpt.me.uk

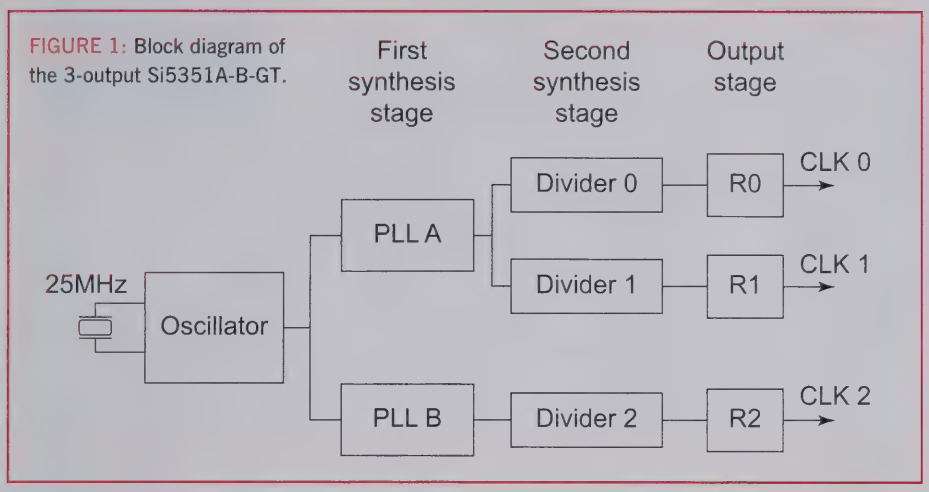


FIGURE 1: Block diagram of the 3-output Si5351A-B-GT.

limiting us to the 60m band (or higher). In practice 80m can be covered by running the intermediate clock at a lower frequency.

It isn't possible to use the R divider in quadrature mode as it breaks the phase shift.

In practice

Although there are three clock outputs there are only two PLLs. Any clock output can use either PLL but in this design it is fixed so that CLK0 and CLK1 use PLLA and CLK2 uses PLLB. The higher output frequency of CLK0 and CLK1 is used to determine the intermediate clock frequency and will have an even integer second synthesis stage divider. The other clock may require a fractional divider and so may have worse jitter or phase noise.

Due to the limited dividers available it is not possible to set CLK0 and CLK1 to different frequencies above 112.5MHz. Also, if one of these clocks is set to a high frequency the other clock will be limited in how low it can be set. For example, if CLK0 is at 200MHz then the lowest frequency for CLK1 will be 6944Hz.

The frequency precision depends on the output frequency. Up to about 30MHz it can be set to the nearest Hz but at 200MHz it will be within about 6Hz.

ATtiny85

The ATtiny85 is an 8-pin microcontroller with an AVR core and is closely related to the chips used in the Arduino. Out of the eight pins there are five I/O pins available to use (the other three are VCC, GND and Reset). Two pins are used for the I²C bus and the remaining three are for the rotary encoder. The ATtiny85 has 8kB of FLASH program memory, 512 bytes of RAM and 512 bytes of EEPROM. In this application the EEPROM is used to store the exact crystal frequency and the initial output frequencies of the three clocks.

Before use, the ATtiny85 needs to be programmed with its software. As it is a surface mount part soldered to the board it cannot be programmed externally (and this would be very inconvenient while developing the software) so it uses a 6-pin In System Programming (ISP) header. This allows an external programmer to update the microcontroller's FLASH, EEPROM and fuses over a Serial Peripheral Interface (SPI) bus.

Circuit description

Figure 2 shows the circuit diagram. The Si5351A runs at 3V3 but the ATtiny85 and LCD display run at 5V. The board requires a 5V supply at J1. D1 is a Schottky diode to protect against accidentally reversing the supply polarity. U3 is a 3V3 low dropout (LDO) regulator that requires at least 1µF ceramic capacitors at C1 and C3 (see the datasheet). Many LDO regulators have strict requirements (both minimum and maximum) on the equivalent series resistance (ESR) of these decoupling capacitors for stability but I chose this part as its requirements are easy to satisfy.

The I²C bus connects 5V devices with

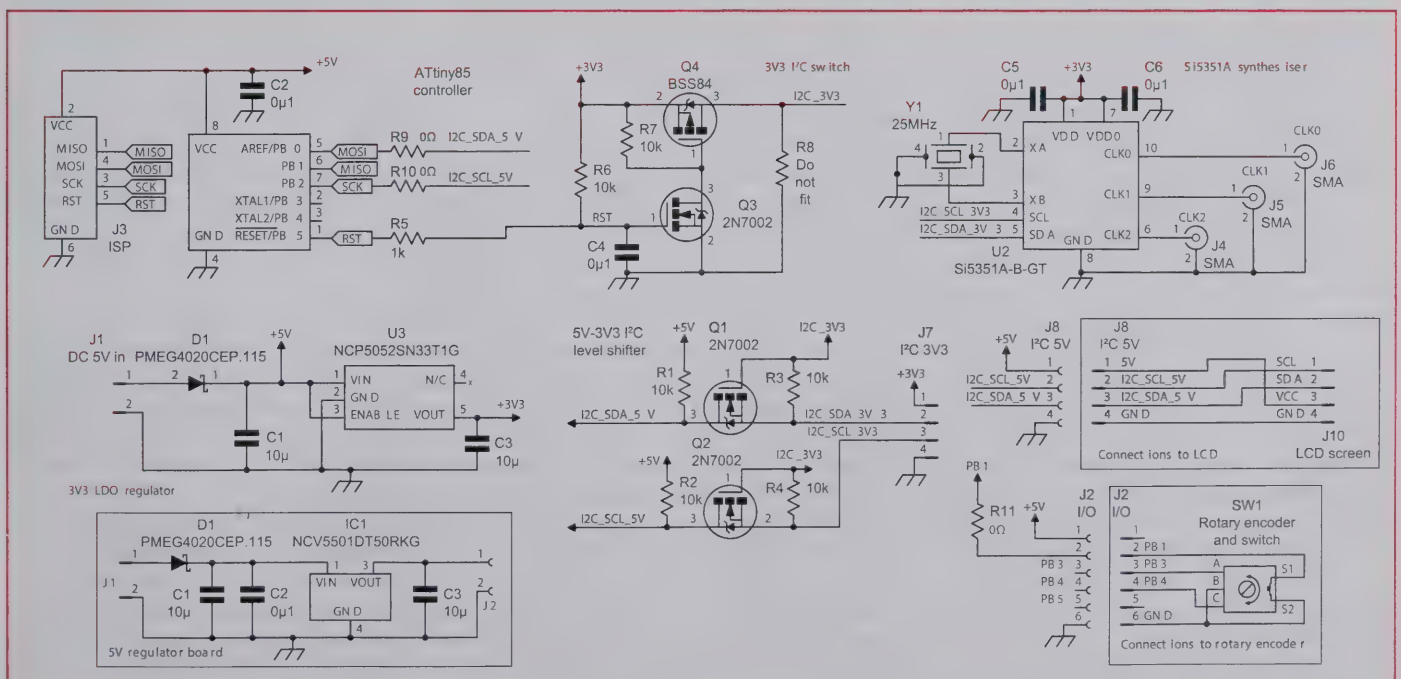


FIGURE 2: Circuit diagram of the frequency generator.

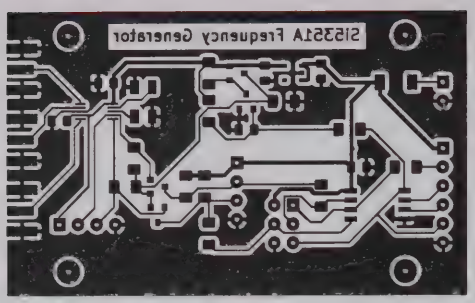


FIGURE 3: PCB foil pattern for the frequency generator main board, scale 1:1, shown mirrored to suit the toner transfer PCB method described.

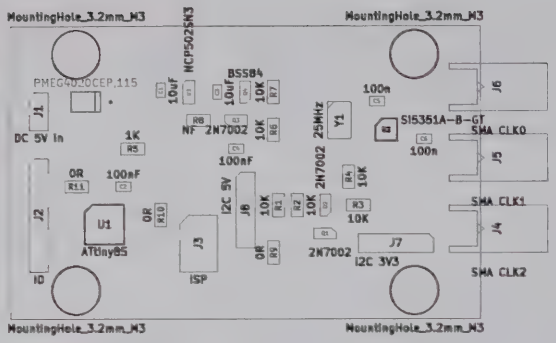


FIGURE 4: Main board component overlay.

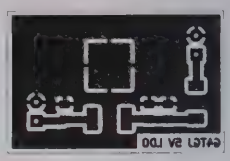


FIGURE 5: Mirrored PCB foil pattern for the 5V regulator, 1:1.

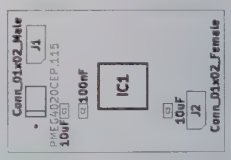


FIGURE 6: 5V regulator board component overlay.

a 3V3 device and so requires bidirectional level shifting. Q1, R1 and R3 are set up in the standard way to do this for the data line; Q2, R2 and R4 handle the clock line. However, there is a complication as the I²C bus shares pins with the SPI bus used for ISP. Although the protocol is very different there is a possibility that the I²C part could interfere with the programming, so it is necessary to isolate the Si5351A while ISP is in progress.

Q3 and Q4 provide this isolation. During ISP the reset line is held low by the external programmer. This turns off Q3 (an N-channel MOSFET) ensuring P-channel MOSFET Q4's gate is held high by R7 turning it off. This disconnects the 3V3 supply to the pull-up resistors R3 and R4. In normal operation the reset line is high switching on Q3. This grounds the gate of Q4, turning it on, connecting the 3V3 supply. R5 is not really needed but will limit the current drawn from the microcontroller's I/O pin if there is a fault. (R8 is not needed and should not be fitted).

There are chips available that perform both level shifting and isolation but I used the parts I had available. A simpler solution would have been to simply provide jumpers to disconnect the Si5351A from the I²C bus during programming but I did not want the inconvenience during development. As it happens, I have never had any issues with the LCD disrupting programming.

The Si5351A itself requires very few components – a crystal and two 100nF decoupling capacitors. The crystal can be between 25MHz and 27MHz – see the datasheet for the exact specification.

The ATtiny85 also requires a 100nF decoupling capacitor.

There are three 0Ω resistors, R9-11. These are simply to aid PCB layout.

The circuit requires a 5V supply at about 50mA, which is provided by a LDO regulator (mounted on a separate, single-sided PCB).

Construction

This article is not a tutorial on surface mount soldering but I can give a few tips. I suggest watching the many videos on YouTube. There are a few items of equipment you will need:

- Fine solder. I use 0.5mm lead-free.
- A decent soldering iron. Mine is a basic soldering station that goes hot enough for lead-free solder.
- A fine soldering bit. I actually find that it does not need to be the smallest, especially when desoldering.
- Flux pen. Liberal amounts of flux makes soldering surface mount components much easier.
- De-soldering braid. You are likely to have some solder bridges and this will make it easy to remove them.
- Tweezers
- A magnifier.

The hardest part to solder is the mini small outline package (MSOP) of the Si5351A. For this you need to apply flux, carefully line it up on the pads and then solder one corner pin. Check it is still lined up, then solder the opposite pin. Double check it is still lined up, apply more flux and use the drag technique (see YouTube) to solder the remaining pins. I always find I get at least one solder bridge but this is easily fixed with the desoldering braid (plus lots more flux). This is where I find the really fine soldering iron bits do not transfer enough heat.

For the crystal, apply a small amount of solder to one PCB pad. Line up the crystal and apply heat to this pad. Once you are happy the crystal is correctly positioned you can solder the three remaining pads. It's important not to apply too much solder to the first pad as the crystal won't sit flat if you do.

The pin headers are through-hole but need to be soldered on the top of the board. To do this, insert them upside down and just far enough so that they don't stick out the other side. Once you have soldered them on the top side you can push the plastic divider down.

The PCB is made on double sided copper clad board. The reverse is a continuous ground plane. There are a number of vias – these are made by soldering a wire top and bottom. Wires offcuts from through-hole components are good for this. The main PCB track layout and component overlay are shown in **Figure 3** and **Figure 4**, and the 5V regulator is shown in **Figure 5** and **Figure 6**. These can also be downloaded from the Github repository **[1]**, along with a pattern for the bottom of the main board (which doesn't require etching: it's simply a good guide to the location of the 16 vias).

I made the PCB using Press n Peel Blue, a toner transfer film. For this, print out the mirrored artwork on to A4 paper with a laser printer (it does not work with an inkjet). Cut out a piece of the film slightly larger than required and tape it over the image (I use masking tape). Only apply tape at the top edge. Feed the paper back into the printer and print the image on to the transfer film. Use an iron to transfer the image to the clean piece of double side copper clad board, following the instructions supplied with the film.

Before etching the board you will need to protect the copper on the opposite side as this forms a continuous ground plane. I use insulating tape for this.

After etching, drill the vias (0.8mm), the header holes (1mm) and the mounting holes (3.2mm). Countersink the non-ground pin headers with a larger drill bit. I use a Dremel on a drill stand with ordinary drill bits (not tungsten carbide).

Software

The software is written in C and built using Atmel Studio 7, which is a free download for Windows. It can also be built using avr-gcc on Linux. The software is open source and is hosted at Github **[1]**. There are also ready-built hex files here that you can program without having to build the software yourself.

The software makes use of TARL ('TGJ AVR Radio Library) **[2]**, a collection of source files that can be used for a number of radio projects. They include general drivers such as for an LCD display or I²C, and radio applications such as a Morse keyer or CAT control.

In-system programming

The software and EEPROM image need to be programmed into the ATtiny85. There are a number of cheap tools available for this such as USBasp (about £3) or you can use an Arduino. It's also necessary to set the fuse bits so that the clock runs at 8MHz. Instructions are provided with the software at Github.

When programming, make sure that you disconnect the board's power so that it is supplied *only* by the programmer.

EEPROM Format

The EEPROM contains the exact crystal frequency and the starting frequencies (in Hz) for the three clock outputs. Its format is:

`TFG xxxxxxxx a ddddddddd b eeeeeeeee c ffffffff`

It always starts with TFG.

`xxxxxxxx` is the crystal frequency

`a` is 0 for CLK0 off or 1 for CLK0 on

`ddddddddd` is the CLK0 frequency

`b` is 0, 1, + or - for CLK1 off, on, quadrature +90° or quadrature -90°

`eeeeeeeee` is the CLK1 frequency

`c` is 0 or 1 for CLK2 off or on

`ffffffff` is the CLK2 frequency.

Note that there must be the correct number of digits, with leading zeroes added if required. Two examples:

`TFG 25000123 1 007030000 1 014000000 1 199999999`

This tells the system that the crystal frequency is 25.000123MHz and sets CLK0 to 7.030MHz, CLK1 to 14MHz and CLK2 to 199.999999MHz.

`TFG 25000123 1 007030000 + 014000000 0 199999999`

This sets the crystal frequency to 25.000123MHz, CLK0 to 7.030MHz, CLK1 to 7.030MHz 90° ahead of CLK0 and turns off CLK2. (If quadrature is set for clock 1 then it uses clock 0's frequency and ignores whatever is in `eeeeeeeee`.)

If the EEPROM is not programmed then it defaults to the following, ready for calibration:

`TFG 25000000 1 025000000 1 004996000 1 009996000`

(25.0MHz crystal, CLK0 25.0MHz, CLK1 4.996MHz and CLK2 9.996MHz).

Calibration

The crystal oscillator is unlikely to run at exactly 25MHz, so its precise frequency (which *you* measure) is programmed into the EEPROM so that the software can compensate and generate the correct output frequencies.

If you have an accurate frequency counter that can read to the nearest 1Hz then you can simply set one of the outputs to 25MHz (which is what the default data sets up for CLK0). The frequency you measure from the selected output will be the same as the crystal frequency. Note it down, then program it into the EEPROM when you program the wanted frequencies. Absent an accurate frequency counter, you can use a receiver to compare the output to a standard frequency transmission. The best way is with an SDR, as you can then compare the signals on the waterfall. Do not connect the clock output directly to a receiver as it is unlikely to tolerate the 3V3 peak-to-peak signal!

I used an SDRPlay RSP1a with the Russian RWM on 4996kHz (it also transmits on 9996kHz and 14996kHz). On my SDR this appeared on the waterfall at 4996005Hz (the 5Hz discrepancy is an inaccuracy in the SDR). The output from the frequency generator was visible at 4996059Hz, so the crystal was running at

$$\text{Actual crystal freq} = \frac{\text{frequency shown for generator}}{\text{frequency shown for RWM standard}} \times 25\text{MHz}$$
$$= \frac{4996059}{4996005} \times 25{,}000{,}000$$
$$= 25000270\text{Hz}$$

Consequently, I reprogrammed the EEPROM `xxxxxxxx` field with the calculated crystal frequency (25000270Hz), keeping the test frequencies unchanged: `TFG 25000270 1 025000000 1 004996000 1 009996000` and again compared the 4.996MHz CLK1 output with RWM. They appeared on top of each other on the waterfall, meaning the generator was accurately set on frequency (because it was synthesising the output frequency from the true crystal frequency, rather than the nominal value).

Once calibration is complete you can set the CLK0, CLK1 and CLK2 fields (`ddddddddd`, `eeeeeeeee` and `ffffffff`) to whatever values you want for your application.

Instead of using a crystal and the calibration method described here, it is possible to feed the Si5351A an external high precision clock, eg from a GPS disciplined source. Although the PCB here isn't set up for this (and the datasheet suggests that the version of the part used here can only be used with a crystal), there is a FAQ that says you *can* feed a clock into XA (pin 2), leaving XB (pin 3) unconnected. The clock must be <1Vpp. This is particularly useful if you have a high stability reference available; just program `xxxxxxxx` with the reference frequency (assuming it isn't 25MHz).

Adding an LCD display and rotary encoder

So far I have only described the circuit on the assumption that it will be used to provide one to three fixed frequencies, essentially as a programmable crystal. However, the software includes the necessary code to support a LCD display and rotary encoder with switch, allowing it to be used as a signal generator or VFO.

The LCD display is a standard 2-line, 16 character display with an I²C interface, which are widely available for around £4. (There are also non-I²C 2x16 displays but these require at least 6 I/O pins for their interface – and we just do not have that many available on the ATtiny85.)

These cheap LCDs appear to have very little (if any) supply decoupling fitted. When using this circuit in a receiver I found I got a buzzing sound every time the display was updated. I put 1000µF across the incoming supply socket, which helped, and 0.1µF across the 5V supply on the display itself, which wasn't enough; adding a further 1µF ceramic across these supply pins worked. All the capacitors are visible in Photo 1.

Although the I²C bus is shared with the Si5351A, the devices have different logical addresses and can coexist.

Connections for the LCD and rotary switch are in the dashed boxes on the circuit diagram.

In order to make best use of the display, the top line shows the three output frequencies (to three significant figures), and the second line shows the exact output frequency in Hz of the clock that is currently being controlled. One of the digits will be underlined – this shows by how much the rotary encoder will change the frequency, similar for instance to the way some SDR software works. To move to the next digit, press the control briefly. A longer press moves to the next clock.

If you repeatedly press the control, the underline will move to the colon. Rotating the control here allows you to turn the clock on and off. If CLK1 is currently selected, you can also select quadrature mode at this position.

Some examples:

```
 5M00 10M0 5000
CLK1:     10004300
```

The top line shows the three clocks are outputting about 5MHz, 10MHz and 5kHz. The bottom line shows that CLK1 is at 10.0043MHz. The underline shows that rotating the control will change the frequency in units of 1kHz.

```
 7M03 -90    .
CLK0:      7030300
```

This shows that CLK0 is outputting 7.0303MHz, CLK1 is also outputting 7.0303MHz with a -90° phase shift from CLK0 and CLK2 is off. Rotating the control will change the frequency in 100Hz steps. As it is in quadrature mode, CLK1 will always follow the frequency set for CLK0.

In use

If using the circuit as a fixed frequency signal generator you may want to add a low pass filter to convert the square wave to something closer to a sine wave. If using it as a VFO you may find that the square wave is ideal, eg both a Tayloe detector in a receiver and a Class E power amplifier in a transmitter work best with a square wave.

Websearch

[1] https://github.com/G4TGJ/FreqGen5351

[2] https://github.com/G4TGJ/TARL

Parts list

Most of these parts are readily available from the major distributors. I found eBay the best place for the LCD and Dupont leads.

Main board

Reference	Style	Detail
C1, C3	0805	10µF ceramic 25V
C2, C4, C5, C6	0805	100nF ceramic
D1	SOD-128	PMEG4020CEP, 115 Schottky diode
U1		ATtiny85-20SU
U2		Si5351A-B-GT
U3	TSOP-5	NCV502SN33T1G 3V3 LDO voltage regulator
J1		2 pin male header 2.54mm
J2		6 pin male header 2.54mm
J3		2x3 pin male header 2.54mm
J4, J5, J6		SMA edge mount socket
J7, J8		4 pin male header 2.54mm (J7 optional)
Q1, Q2, Q3	SOT-23	2N7002
Q4	SOT-23	BSS84
R1-R4, R6, R7	1206	10kΩ
R5	1206	1kΩ
R8		not fitted
R9, R10, R11	1206	0Ω
Y1	5x3.2mm	25MHz 4 pin SMD crystal eg Abracon ABM3B-25.000MHZ-10-1-U-T
SW1		Rotary encoder with pushbutton
LCD		1602 LCD with I²C interface

5V regulator board

C1, C3	0805	10µF ceramic 25V
C2	0805	100nF ceramic
D1	SOD-128	PMEG4020CEP,115 Schottky diode
J1, J2		2 pin male header 2.54mm
IC1	D-PAK	NCV5501DT50RKG 5V LDO regulator

Sundries

M3 mounting hardware

Dupont female-to-female leads for connecting between pin headers

1000µF, 1µF and 0.1µF additional decoupling capacitors (see text).

A DIY programming lead for the Tait T2020, continued from p27

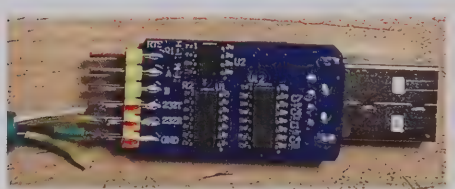


PHOTO 4: Connections to a 'type A' USB to RS-232 converter.

PHOTO 5: A converter housed in an old USB memory stick case.

PHOTO 6: Heatshrink can make a very serviceable enclosure.

clear heatshrink over the circuit board itself you can see the various LED's flashing to show all is well, with Rx and Tx data happily flowing back and forth. But a word of advice: test it BEFORE putting it in a case or putting on the heatshrink.

Just as an aside, I prefer to remove all the pins from the back of the board and even remove some of the switches, replacing them with hardwired links. This reduces the profile of the board and makes it easier to package.

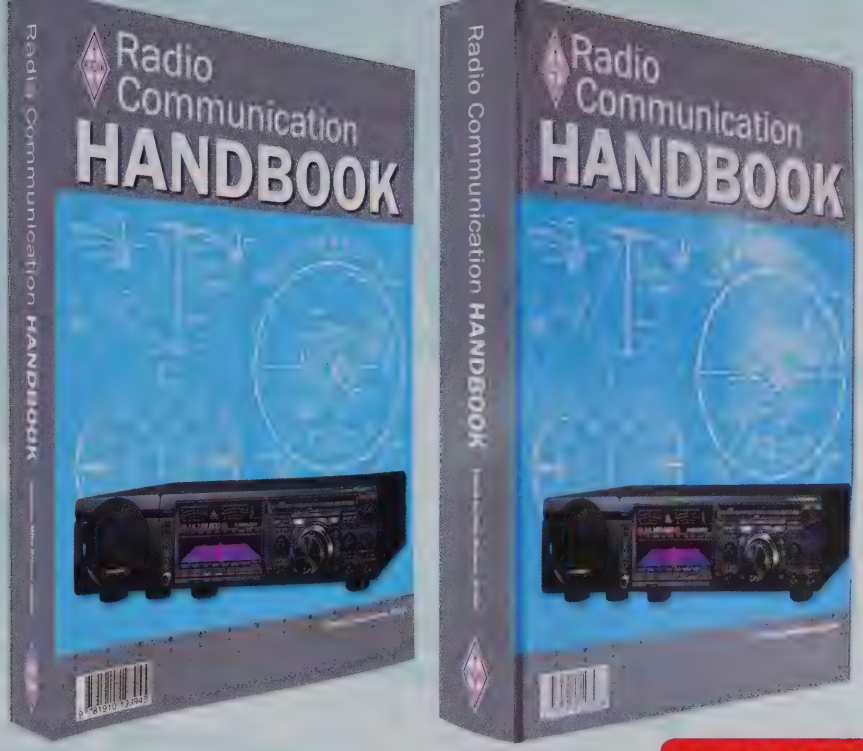
In use

These converters are straightforward to use. They use genuine Si-Lab chips so drivers are not an issue: you just plug the converter into your laptop/PC, which then finds and installs the appropriate drivers. I normally reboot after installing drivers but it's not strictly necessary.

The next step is to run the Tait programming software, which can be found on the internet. You may need to set it to look at the correct COM port. To do this, go into the computer's Device Manager to see what port the machine has allocated to the adapter, then in the Tait software click on Tools, select Options, click on COM Port then enter the COM port number you've just discovered. Click on OK and you should be sorted.

In the unlikely event you can't get the Tait software talking to your radio, try transposing the Tx data and Rx data connections you made to the converter board. What's transmit or receive on RS-232 notoriously depends on which side of the plug you consider!

You should now have a working programming lead for about a fiver and a little time. This will let you re-program the Tait T2020 series radios to meet your amateur band requirements.



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Contesting

Three series of RSGB contests end this month, two on 80m and one on VHF.

November is the final month of the 80m Autumn Series and we start with datamodes on Monday 2nd. The SSB session follows on Wednesday 11th. The Club Calls Contest follows, on Saturday 14th. Now also known as 160m AFS, it's the third in the 2020-21 series of Super League events. The final one of this year's series of FT4 contests takes place on Monday 16th. The Second 1.8MHz Contest is on Saturday 21st and the very last of this year's 80m Autumn Series is CW on Thursday 26th.

The 2m FM Activity Contest and UK Activity Contest are on Tuesday 3rd. Activity continues to climb, with the top stations now making close to 300 QSOs in the 2m UKAC – and sometimes more. The final event in this year's VHF CW Championship series is the Marconi CW contest, which takes place for 24 hours over the weekend of the 7th-8th. There are also 6-hour sections. After that it's a straight run of Activity Contests through to the end of the month. The 70cm FMAC and UKAC are on Tuesday 10th and the 6m UKAC is on Thursday 12th. The 23cm UKAC is on Tuesday 17th, the 4m UKAC on Thursday 19th and the SHF UKAC on Tuesday 24th.

Ron, 2E0EKW emailed on how he fared in the 2m UKAC in September, when propagation was much enhanced. With 10W and a vertical collinear he was pleased to work greater distances than usual from his home in IO92, including the Isle of Man. I suggested he try horizontal polarisation for SSB, which he did in the 2m Trophy contest a few days later. He reported; "The first [antenna] was a halo loop and the second was a 2-element beam. I lashed up a vertical wooden pole and tried the halo first on the Saturday. This was a real breath of fresh air to me as I got some good contacts including GD8EXI and Sheffield, amongst others at around the 90 mile mark. Later in the day I used the beam and for the remainder of the competition had excellent results (for me), including Scottish stations, Cornwall and the Isle of Sheppey. Like yourself, others in the club [the Stratford upon Avon & District RS] had suggested I try horizontal polarisation and it was well worth the effort." I have asked Ron to let me know the results of some tests he intends to conduct with a local, to give real world differences between a vertical collinear and a small horizontal beam.

The UKEICC DX SSB contest continues until midday on Sunday 1st. November is the third month of the current UKEICC 80m series, with the SSB leg on Wednesday 4th, note the exchange required is now the full 6-figure locator. The RTTY leg of the Worked All Europe DX contest runs for 48 hours over the weekend 14-15th. Unlike the other modes, everyone can work everyone on RTTY. The UK Microwave Group has a Low Band contest on Sunday 15th. Because daylight hours are limited in November, this one ends earlier than others in the series. This is so that portable stations can pack up and vacate hilltop sites while it is still daylight. The CW leg of the EKEICC 80m series is on Wednesday 25th, note the change in the exchange mentioned above. The biggest contest this month is CQWW DX CW, which runs for 48 hours over the weekend of 28-29th. Sunspot Cycle 25 has now officially been declared as having begun in December 2019, but don't expect great things from it yet. Propagation is still likely to be marginal on the upper HF bands,

Steve White, G3ZVW
steve.g3zvw@gmail.com

RSGB HF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Mon 2 Nov	Autumn Series	2000-2130	Data	3.5	RST + SN
Wed 11 Nov	Autumn Series	2000-2130	SSB	3.5	RS + SN
Sat 14 Nov	Club Calls (1.8MHz AFS) §*	2000-2300	CW, SSB	1.8	RS(T) + SN + Club info
Mon 16 Nov	Monday FT4 Series #9	1900-2030	FT4	3.5	Report + 4-character Locator
Sat 21 Nov	Second 1.8MHz *	1900-2300	CW	1.8	RST + SN + District code
Thu 26 Nov	Autumn Series	2000-2130	CW	3.5	RST + SN

RSGB VHF Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange
Tue 3 Nov	144MHz FMAC	1900-1955	FM	144	RS + SN + Locator
Tue 3 Nov	144MHz UKAC	2000-2230	All	144	RS(T) + SN + Locator
Sat-Sun 7-8 Nov	Marconi CW Δ	1400-1400	CW	144	RST + SN + Locator
Tue 10 Nov	432MHz FMAC	1900-1955	FM	432	RS + SN + Locator
Tue 10 Nov	432MHz UKAC	2000-2230	All	432	RS(T) + SN + Locator
Thu 12 Nov	50MHz UKAC	2000-2230	All	50	RS(T) + SN + Locator
Tue 17 Nov	1.3GHz UKAC	2000-2230	All	1.3G	RS(T) + SN + Locator
Thu 19 Nov	70MHz UKAC	2000-2230	All	70	RS(T) + SN + Locator
Tue 24 Nov	SHF UKAC	1930-2230	All	2.3-10G	RS(T) + SN + Locator

Best of the Rest Events

Date	Event	Times (UTC)	Mode(s)	Band(s)	Exchange/info
Sat 31 Oct - 1 Nov	UKEICC DX SSB	1200-1200	SSB	3.5-28	RS (optional) + SN + District code
Wed 4 Nov	UKEICC 80m	2000-2100	SSB	3.5	6-character Locator (Grid) square
Sat-Sun 14-15 Nov	WAE DX RTTY	0000-2359	RTTY	3.5-28	RST + SN
Sun 15 Nov	UKuG Low Band	1000-1400	All	1.3-3.4G	RS(T) + SN + Locator
Wed 25 Nov	UKEICC 80m	2000-2100	CW	3.5	6-character Locator (Grid) square
Sat-Sun 28-29 Nov	CQWW DX CW	0000-2359	CW	1.8-28	RST + CQ Zone (UK=14)

In the case of differences between this calendar and the Contest Committee website, the website takes precedence.
* HF Championship event. Δ VHF CW Championship event. § Super League event.
For all the latest RSGB contest information and results, visit www.rsgbcc.org

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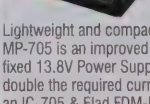

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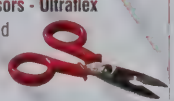

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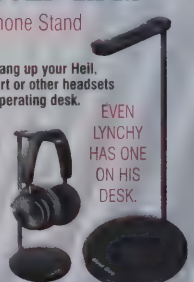

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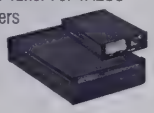

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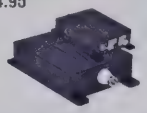

Full specifications see HamRadio.co.uk/MAT

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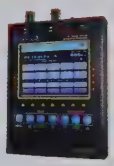

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see www.HamRadio.co.uk/sark110

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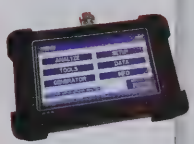

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see www.HamRadio.co.uk/MetroVNA

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see www.HamRadio.co.uk/hustler

HUSTLER

Base Station Range. Free standing, max 7.3m tall, 1kW

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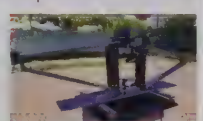

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MyDEL

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ATV

ATV Netherlands to UK

In August the Netherlands amateur radio society, VERON, organised a one-day reduced-bandwidth (RB) DATV experiment on 144MHz. It was a great success, with contacts at over 240km within the Netherlands. Two of the transmissions were received in the UK. Richard, G4YTV received PA0JCA at 380km and PA800D at 403km, just short of the 407km DATV record for the band.

The transmissions were DVB-S, 125kS, FEC 1/2, H264 on 145.300MHz; PA800D was the callsign of the Dordrecht Radio Club and they were running 100W to two Yagis. More details, including a video, are at [1]. Many of the QSOs were arranged and plotted using the BATC's DXSpot website [2]. Given that the propagation conditions were pretty normal, the map of the day's activities in **Figure 1** is quite impressive.

PHOTO 1: The 25m diameter Dwingeloo Radio Telescope dish. (Source: Wikimedia, credit: Uberprutser).

70cm UK to NL using Dwingeloo

On 13 September the 25m radio telescope at Dwingeloo in the Netherlands was made available for amateur TV reception during the VERON amateur television contest. Although the site was not allowed to transmit (which is only permitted above 10° elevation) they managed to receive 39 different ATV stations including Noel, G8GTZ/P at Walbury Hill in Berkshire and Rob, M0DTS/P at Ravenscar in Yorkshire. Both were transmitting RB-DATV on 70cm. Unusually, the team at Dwingeloo used an RTL-SDR dongle as their receiver with SDRAngel software: it just goes to show that you don't necessarily need specialist receiver hardware to receive DATV [3].

FIGURE 1: DXSpot Map of 144MHz DATV Contacts on 22 August 2020.

Online BATC Convention – 24 October

This year's BATC Convention will go ahead online on Saturday 24 October. The presentations will start at 10am and be available for all to view, either on Zoom or via the BATC Streamer. Lecture highlights will include the latest on the Ryde DATV receiver and the Portsdown 4 DATV transceiver. Both projects are based on the Raspberry Pi 4. Full details of the convention program and how to join the Zoom meeting will be published on the BATC Forum [4].

The formal programme will finish at 4pm but there will be an open net on QO-100 (10499.25MHz, DVB-S2, 333kS, FEC 2/3, H264) from 8pm. All are welcome to transmit (probably one over each) or simply view, off-air or on the BATC Streamer.

TABLE 1: BATC Convention initial speaker list.

Video production for online streaming	David, G4NRT
BATC low-latency streaming after Flash end-of-life	Phil, M0DNY
The Ryde DATV receiver	Tim, MW0RUD
Using the Ampleon pallet PAs for 2.4GHz	Michel, HB9DUG
DVB-T receiver for amateur use	Charles, G4GUO
Portsdown 4 with Pluto and HDMI	Dave, G8GKQ

Websearch

[1] https://www.pi4dec.nl/datv-van-pa800d-vanuit-pi4dec/

[2] https://dxspot.batc.org.uk/

[3] https://www.camras.nl/en/blog/2020/amateur-tv-reception-in-the-dt/

[4] https://forum.batc.org.uk/viewforum.php?f=128

Dave Crump, G8GKQ
dave.g8gkq@gmail.com

The trend of IOTA VHF

PHOTO 1: The 6M7JHV above the SteppIR DB18E.

I have been licensed for over 52 years, but only began listening to 50MHz in 2013 when I installed a 7-ele beam from M2 Antenna Systems, 6M7JHV (**Photo 1**). Signal propagation on this band is influenced by weather conditions in the lower troposphere, up to 7-8km above the Earth's surface. Major storms, cold air fronts, fog, and just simple differential cooling of the air in the upper versus lower atmosphere in the morning and evening create temperature inversions that generate openings for communication to 1,600km and beyond for single hops, while high-pressure systems without clouds and wind will improve distant signals.

Cyclical ionisation of the F layer, situated 150 – 800km above the Earth, under high solar flux conditions will facilitate propagation of 50MHz signals for long distance communication. Additionally, such signals can bounce off highly ionised gas patches in the lower E region of the ionosphere, situated 90 – 150km above the surface, creating conditions for long distance communication too. However, the formation of these patches, and their movement at speeds of a few hundreds of km/h, determine that favourable conditions are sporadic, and may only last for a few seconds. Unlike HF propagation, VHF propagation is far more complex and less predictable, with signals appearing and disappearing on 50MHz (6m) suddenly, hence its well-deserved nickname the 'Magic Band'.

I started to operate on 6m out of curiosity and the first season of 2013 and even 2014 were quite exciting. However, despite being at the middle of the respective solar cycle (**Figure 1**), the solar flux was significantly less than in the previous three cycles, which must have led to less rewarding propagation conditions for everyone. Additionally, I knew very little about the VHF propagation, and both its stark difference with the HF propagation and the moderate solar flux conditions resulted in relatively poor results over the next few years.

The introduction of FT8 in 2018, capable

Cezar Trifu, VE3LYC
ve3lyc@hotmail.com

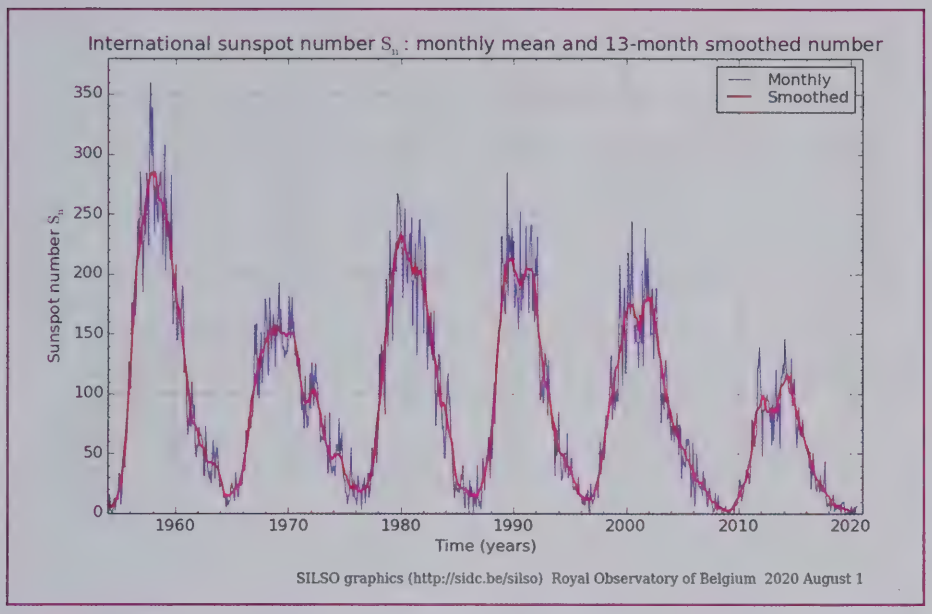
International sunspot number S_n : monthly mean and 13-month smoothed number
Monthly
Smoothed
Sunspot number S_n
Time (years)
SILSO graphics (http://sidc.be/silso) Royal Observatory of Belgium 2020 August 1

FIGURE 1: Recent past solar cycles.

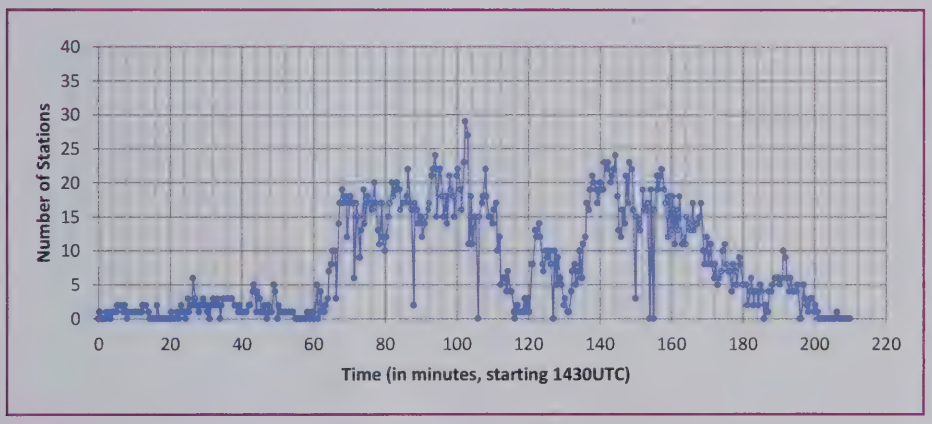

FIGURE 2: The number of European stations copied as a function of time (11 July 2020).

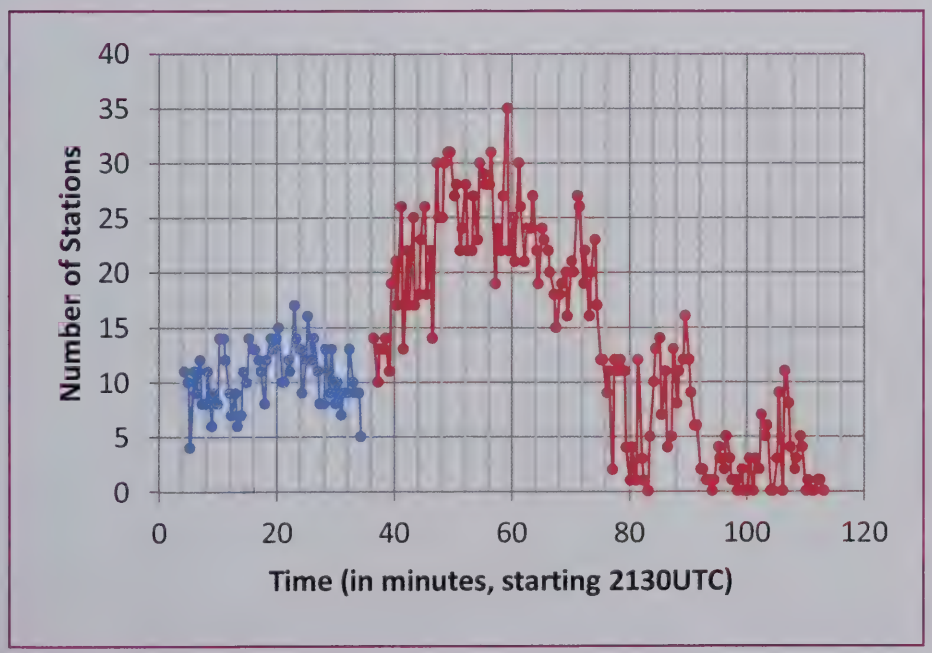

FIGURE 3: The distribution of European (blue) and Japanese (red) stations copied as a function of time (11 July 2020).

50MHz Propagation

Six metres (50MHz) exhibits a wide range of propagation modes from tropo, meteor scatter and aurora through to F2 and even EME. But by far the main mode for making DX contacts is mid-latitude Sporadic-E (Es) that every summer supports propagation at 50MHz, 70MHz and (from time to time) 144MHz.

Sporadic-E is intermittent and difficult to predict, but it is most frequent between May and August (in the northern hemisphere) and tends to peak twice during the day – late morning and early evening at the point of reflection. There is *no* apparent link between Es and solar activity – Es occurs every year, throughout the solar cycle. Although formed at about the same height as the 'normal' ionospheric E layer, the mechanism of creation and the structure of Es are very different. Es patches can be extremely dense, but they are also very thin (0.5km to 5km), with a horizontal extent from a few to hundreds of kilometres. They are usually moving horizontally at 20 – 130ms^{-1}, driven by high-altitude winds. All this means that signals can be very strong, but they can come and go very quickly.

Es regularly supports 50MHz contacts over single-hop paths out to 2,500km, and over multiple-hop paths to much greater distances. The signals received from Europe were probably by multi-hop Es. But the high-latitude propagation frequently observed (this year, at least) over the 10,000km+ paths to Japan from VE3 and the UK seem to require something different. The mechanism for this so-called 'Short-path Summer Solstice Propagation' (SSSP) [1] is not well understood; the path goes well north of the Arctic Circle and mid-latitude Es is rare so close to the pole. Mid-latitude Es probably delivers the first hop at each end, but what happens in between is less clear. Auroral E, which is similar to Es but has a different cause and occurs mainly in the polar regions, may be involved, or there may be something more exotic going on such as Polar Mesospheric Summer Echoes (PMSE).

It's finding and exploiting the propagation, when it occurs, that makes six metres so much fun.

Chris Deacon, G4IFX, UKSMG

[1] "Short-path Summer Solstice Propagation", Han Higasa JE1BMJ, *Six News* #89, UKSMG October 2006.

to ensure contacts under reduced signal to noise ratio, was a game changer for 6m. Two years later, at the end of the 2019 season, my totals rose to 69 DXCCs and 420 VUCCs (number of square grids) confirmed. Reaching 100 DXCCs seemed possible, but with only 46 IOTAs, IOTA VHF seemed more wishful thinking than anything else. The Covid-19 lockdown and subsequent travel limitations in the late Spring and Summer of this year pushed me to spend a lot of time in front of the radio, mainly on this band. Worth noting, I regularly checked various internet resources that provided online information about Sporadic-E conditions (https://dxmaps.com), tropospheric forecast (https://dxinfocentre.com/tropo.html) etc.

Despite being at the very bottom of the solar cycle, Sporadic-E propagation delighted me with several short but wonderful openings into various parts of Europe, Caribbean, Central America, northern South America, as well as Central Africa. But my biggest surprise of the season was an amazing opening to Japan, my first ever. **Figure 2** shows the distribution of the number of European stations I copied as a function of time during the local morning and afternoon of July 11, 2020 (local time = UTC -4), which offered me the longest daily propagation time window to Europe this season, while **Figure 3** presents the number of Japanese stations I copied the same day, in late afternoon. Note that propagation was actually open to Europe in late afternoon too, but when I copied some North American stations calling Japan I swung the beam toward it.

The graphs show two great openings to Europe, which lasted about 48 and 40 minutes respectively, with about 20 stations decoded at 15s intervals. The intense propagation window to Japan lasted about 40 minutes, with a slightly higher number of stations copied, around 25 per 15s. Most daily openings to Europe and other parts of Central and South America observed here in south-eastern Ontario (VE3) were shorter and with much less stations compared to the above. At times, some were just long enough to allow for one single contact.

The Islands on the Air (IOTA) programme offers a separate award category for VHF contacts. **Figure 4** shows the evolution of the number of stations in the annual listing since 2004 when the first IOTA VHF award was claimed by SM7AED. A total of 24 stations were listed in 2020, 20 of whom were from Europe, two from the US and two from Japan. In order to continue being listed, a station must update at least once in five years. **Figure 5** presents the total number of credits claimed by the station on top of the annual IOTA VHF listing. The highest score is 218, claimed by IW9HII since 2019.

I anticipate that use of FT8, which offers an increased opportunity for contacts through tropo and Sporadic-E communication compared with CW (and most certainly with SSB), together with the possibility for chasers now to claim IOTA credits through QSO matching via Club Log and Logbook of The World (LoTW), will lead to a significant boost in the interest for IOTA VHF. Meteor scatter and moonbounce (EME) operations will bring additional fun and offer even more possibilities for contacts. Thus, I expect that the number of stations making the respective annual listing is likely to increase more than ever before. While the 6m chasers will continue to be heavily driven by the pursuit of DXCC and VUCC, more and more IOTA chasers used to the HF bands will take their chase to VHF. I look forward to some exciting 6m seasons in 2021 and beyond!

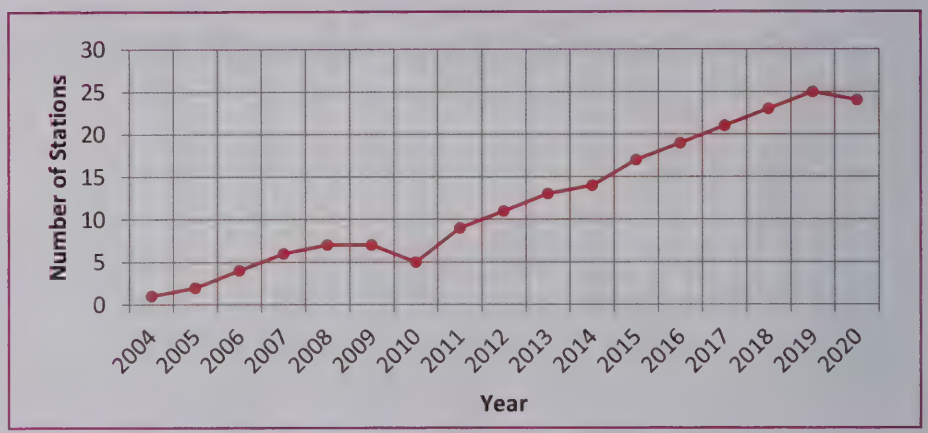

FIGURE 4: Number of stations in the annual IOTA VHF listing.

FIGURE 5: Number of IOTA VHF credits claimed by the top station in the annual listing.

Authors Wanted

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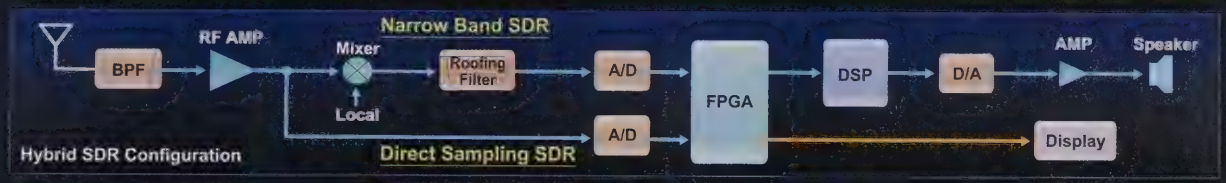

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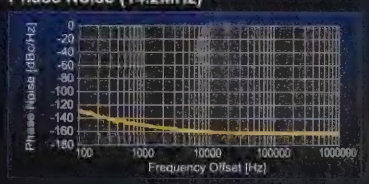
14MHz Band Reciprocal Mixing Dynamic Range (RMDR)

1st Local OSC Phase Noise (14.2MHz)



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GB100GKU

A dramatic view of the Portishead Radio receiving site at Highbridge, late 1940s.

The ubiquitous 4BTV vertical used by GB100GKU.

Celebrating 100 years of the UK's long-range maritime radio service, Devizes Radio, that later became Portishead Radio.

The year 2020 was supposed to be a year of celebration. 100 years had passed since the commencement of the UK Post Office's long-range maritime radio service at a site at Morgan's Hill, near Devizes. Known as 'Devizes Radio', the station provided communication to ships in the Atlantic Ocean and Mediterranean Sea on long wave frequencies. The station relocated its receiving site to Highbridge, Somerset, in 1925, and the transmitters moved to Portishead, near Bristol, in 1928, and took on the famous name of 'Portishead Radio'.

Despite regular relocation and expansion of transmitter sites, the station retained its name until closedown on 30 April 2000.

Plans were made during 2019 to celebrate the occasion with a staff reunion, a local exhibition of radio station artefacts and memorabilia, talks to local clubs and societies, and the publication of a book detailing the history of the station. In addition, a celebratory amateur radio station, resurrecting the original callsign of the station, GKU, was discussed.

The original plan for the station was to operate it from the receiving aerial site at Highbridge, where some of the concrete mounting blocks for the aerials still remain. This would, of course, have necessitated permission from the land owner, and to erect suitable aerials in the field. Power would also need to have been provided. Callsign GB100GKU was decided upon, and an application for that callsign from Ofcom was drawn up.

Sadly, as events turned out, many of these plans had to be cancelled. Some talks took place at the end of 2019 and early 2020, but as soon as lockdown commenced in the UK it was clear that the staff reunion and exhibition would have to be cancelled, as well as all remaining talks scheduled for the rest of the year.

The book, *Portishead Radio – A Friendly Voice On Many A Dark Night*, which was planned to have been launched at the reunion and followed by a local book-signing, was brought forward and published at the end of May (see New Products, page 15). Initial sales were encouraging and continue to flourish worldwide; reviews have been very complimentary.

As regards to the amateur station, it was decided to abandon the operation from the Highbridge site and operate from the home QTH of G4HLN. This, of course, would mean that GB100GKU could not be used at the time of application, so GB0GKU was successfully applied for. However, Ofcom eventually relaxed the regulations to allow non-standard special event callsigns from a home QTH, so GB100GKU was successfully applied for, to operate between 1 and 28 July.

Operating from home brought its own problems, in this case the size of the garden; it soon became clear that operation on 80m and 160m would not be possible, so it was decided to operate on all bands between 10m and 40m. A Kenwood TS-570D was used as the main transceiver, running 100W into a 4BTV vertical, roof-mounted with plenty of radials. An old-style paper logbook was maintained for the duration of operations. For 12m and 17m, a WARC trap dipole was employed.

A special QSL card was designed and printed, and a target of 1000 QSOs over the 4 weeks of operation was decided upon, but it soon became clear that this target would be exceeded easily after the first few days of operation. In fact, the first 1000 stations were contacted after only 8 days.

In total, 2,755 contacts were made, from 69 DXCC countries. The most worked countries were: Germany 650, Russia 250, Italy 170, Czech Republic 164, Poland 140, Ukraine 127, France 122, England 96, Spain 83 and Sweden 77.

Conditions, apart from the first couple of days, were extremely poor, with bands very quiet during daylight hours. Despite this, some DX was able to be worked, with stations from VK, JA, PY, OA, HK, 9Y, VU, PJ and TZ

THE GB100GKU operating position at the home of G4HLN.

The GB100GKU QSL card.

The Fifth Ocean certificate allocated to GB100GKU showing an Antonov AN-124 aircraft.

all managing to be contacted. 10m was open on a few days, but no contacts were made on 12m. 15m was generally very quiet, although a few contacts were made. Most activity took place on 20m, 40m, 17m and 10m, the vast majority on CW. There was contest activity on a couple of weekends, but the station did not take part.

It was good to use my ex-GKA Morse keys from time to time, although most contacts were worked with my Bencher BY-1. However, I did observe that the Bencher did not take kindly to my style of 'aggressive' keying – the keys used at GKA were much more substantial!

Was it enjoyable? Mostly, although some of the familiar high-powered stations from Europe had a habit of taking over my working frequencies on occasions. Also, sadly, a few examples of bad operating, again mainly from Europe, with over-calling and lack of listening. Nothing new.

There were also a few amusing incidents. As previously mentioned, radio conditions were poor but sometimes variable. I heard a strong 599 signal from a station in Gibraltar who responded with an RST of 539, which was not unexpected. However, when I gave him a 599 in return, his response was "I doubt it", which took me a bit unawares; I do like to give honest reports.

Then there was a station from the Czech Republic who berated me for working on 20m most of the day "do you only work on 20m?", even though the higher frequencies were dead and it was too early for reliable 40m communications with Europe. I did work him on 40m later that evening, which no doubt made him extremely happy.

There were a few 'pile-ups' generated, which was sometimes reminiscent of lining up ships (QRY) when I was working at GKA. On a few occasions I was working around three or so stations every minute.

It was good to contact many ex-seagoing Radio Officers, many of whom expressed pleasure at working a Portishead Radio callsign again. In addition, ex-staff from many Coast Radio Stations made contact, such as Norddeich/DAN, Scheveningen/PCH, Lyngby/OXZ, Madrid/EAD, Gothenburg/SAG, Rugen/DHS and Rome/IAR amongst others. A couple of /MM stations also made contact, but they did not appear to be operated by Radio Officers.

At the end of operations, I took the opportunity to check to see if the station had qualified for some of the Russian hamlog.ru awards and was pleased to find out that numerous certificates could be downloaded. One in particular was of interest, which depicted an Antonov AN-124 aircraft operated by Heavylift/Dnepr that was one of Portishead Radio's aeronautical service customers.

My thanks to all who contacted GB100GKU, and I do apologise to the stations who tried and failed; I did hear many stations in the noise, but prevailing QSB and QRN made it impossible to complete a contact on a few occasions. Also thanks to my long-suffering partner, Wendy, who took my regular disappearances to the shack at all hours of the day and night with good humour.

Further details of Portishead Radio and the UK's long-range maritime radio service can be found at the website www.portisheadradio.co.uk, which contains a wealth of information, photographs, audio and video files, together with numerous memories of the station.

Larry Bennett, G4HLN
lawrence.bennett@btinternet.com

HF

The official word is that we are now into the new solar cycle – but the sun hasn't got the message and there was very little sunspot activity last month.

Peter, G4XEX's antenna – as high as his planning restrictions allow.

Peter, G4XEX's shack, see his report in the Correspondence section.

But, as always, the DX was there if you were around at the right times – and on 20m it was there most of the time.

The CDXC HF Challenge for working DXCC entities on 15-6m is entering its last days as I write this. I expected that even at sunspot minimum participants on 15m would have been able to work all of South America, much of the Caribbean, the USA and Canada, all of Africa where there is activity, the Indian Ocean, and Asia all the way across to Indonesia. Europe should have been workable via Sproadic-E (Es) or backscatter. Australia, maybe, on good days. The challenges would have been the Pacific including Hawaii and Japan – both of which are on polar bearings about 30° each side of North. The central Pacific around Fiji would have been impossible without more sunspots.

So how did things pan out? With a few days to go, 5Z4VJ is leading the Machine Generated Modes section with 139 DXCCs. MOBEW is in 2nd place with 128. On traditional modes, G0FWX is leading with 86 and M0BEW is 2nd with 79. Leading participants on both modes have indeed worked all the areas I expected above but at the moment it seems none of Hawaii, Alaska, Japan or Guam have been worked on traditional modes from the UK but Japan and Guam have been worked on MGM. I will report on the final results next month.

Don't forget the biggest contest of the annual calendar is CQWW SSB on the last full weekend of October. This is an opportunity to learn about propagation and collect a few new countries.

This month I am using Club Log to look at HF propagation from the UK to Indonesia, **Figure 1**. The country is on the equator, so propagation is affected by absorption during its daylight hours even on HF. The best times for the UK are from around 1100UTC onwards – slightly earlier on 12 and 10m. A further complication is that the country is over 3000 miles from East to West, so propagation to Irian Jaya in the East will happen at different times from propagation to Sumatra, which is further West. As you might expect 15m is the best band above 20m at low SFI but 10m is quite useful at medium values of flux. The low QSO counts on 17m and 12m reflect the relative numbers of users of those bands and the absence of contests. You should be able to work YB on 20m most afternoons and on 30/40m for a few hours after dark on most days.

Out of interest I looked at total Club Log G-YB QSOs on 160/80/40 at all values of SFI, **Figure 2**. There were just a handful per month on 160 and not many more on 80, but 40m saw 200-600 per month. I'm not quite sure why the difference between bands is so great. Most likely it is a combination of factors: atmospheric noise (especially from the constant thunderstorms in YB) increases with wavelength, and good antennas are much harder to build on 80/160.

I also looked at the total number of G-YB QSOs on 80/40 and 10 on days when the SFI was 60-80 and 110-150. The results are shown in **Table 1**.

Note that there were 25% more days with low SFI but the differences are much more pronounced than this. 10m is about 20 times better at medium levels of SFI. 80 and 40 are about 6 times better at low levels of SFI. Again, I find the LF numbers slightly surprising. Low sunspot numbers are generally held to mean better LF conditions – if only because of an absence of geomagnetic disturbances, but not by a factor of 6. The difference may be largely

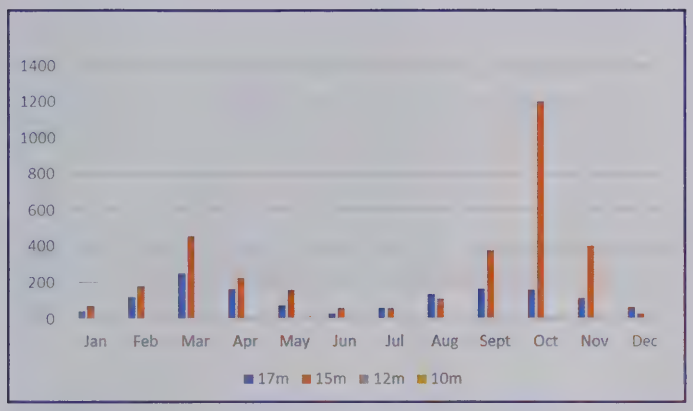

FIGURE 1: Using Club Log to look as HF propagation from the UK to Indonesia.

FIGURE 2: G-YB contacts with a high solar flare index (110-150).

due to operators heading HF when the bands are open there.

News

It seems the ARRL may shortly review the DXCC status of Scarborough Reef and the Spratly Islands in the South China Sea depending on what actions the US takes with regard to recognising Chinese claims in the area. Scarborough Reef is really too insubstantial to justify a presence on the list but if it gets deleted it will be for political rather than geophysical reasons. The downside of deletion is that we will miss future pictures of operators sitting on tiny wooden platforms attached to the handful of rocks that are above the high tide mark – though by now the Chinese may have developed the reef. The Spratly Islands are mostly more substantial (or have been artificially enlarged) and are occupied by a number of the surrounding countries.

TABLE 1: G-YB QSOs in Club Log on 10/40/80m at two SFI levels.

	SFI 60-80 (6643 days)	SFI 110-150 (5329 days)
10m	72	1573
40m	2184	342
80m	172	26

At last I have some DX news to report. Erik, LA2US should now be on Jan Mayen Island for winter at the Norwegian base and expects to be reasonably active until March. Unfortunately, this has cast doubt on the plans of LA7GIA to lead a DXpedition there in September 2021 so we will have to wait and see whether he can still get enough financial support.

Cezar, VE3LYC has decided to head off to the new Pacific IOTA group announced last year – Tatakoto Island. He has to take several Covid tests en-route but, if all goes well, he will be on the air as TX0T from 29 October to 5 November. Propagation to French Polynesia is not too difficult from the UK so there should be openings on 40/30/20 around 0700-0900UTC and again in the afternoon on 20/17/15 around 1500-1800UTC.

XR500M is to celebrate the 500th anniversary of the discovery of the Strait of Magellan. The Chilean Pacific DX Group based in Santiago is running this on HF for the month of October.

Correspondence

CW QSOs in blue, SSB in red, FT8 and other data modes in black italics. L= Linear, - = No Linear, S = Simple Antennas, B = Beam.

Fred, G3SVK [LS] found conditions poorer than he had been expecting. On 20m – 9Z4Y, 5T5PA, PY1QQ, TZ4AM, A60ARS/2, ZS1OIN, HZ90SJ, HZ1TT, PJ2A, PJ4DX, PX2A, CE2BMW. And on 40m – HZ1BL, A41CK, VEs, CX1AA, VU2GSM, ZL4RMF, ZL3PAH, ZL3XDJ, PJ4AA, HZ1C, ZL3OZ, VK2GR, OJ0R.

Peter, G4XEX [LS] was also disappointed with the conditions but kept busy: 17m – *J68HZ, YB5QZ, OD5TX*; 20m – *TZ4AM, PJ5J, PT4A, PJ4A, D4Z, V51JP, VU2DSI, 8A100GB*, 9M2TO, YB8TK, OD5KU, JO1PWP, YB0AZ, JAs, YB0WYN, TR8CA, ZP5DBC, JN1CJS, YC9BCA, J69DS, YV5JLO, T6AA; 30m – *FG8OJ*.

Tony, M0IQD [-B] found quite a bit of DX on SSB:10m – PT5J; 15m – 9Z4FE, FR4QT, LW1D, CE7VPQ, PZ5RA, CB6T, CV7S, NP4Z, ZD7FT, VK2DX, YC9BHJ; 17m – 5T4PA, JAs, PZ5RA; 20m – TZ4AM, YV7PMG, FG4SO, ZD7FT, 9M63MJ, JAs, E21YDP, BG4OP, 9V1YC, BD7BM, ZSs, S79VU, KP2M, KL7KK, E51JD, VU2XO, VP2EKG, VR2XAN, ZF2LZ, E2A, TO0Z, 3B8CW, V51JP, CP5HK, 4A50CRH, VK3CFA, VK4KA, Z81B, 3DA0TM; 40m – ZL4RMF, KP4DZ, VK2s, VK7VZ. All of that DX worked with 100W on SSB with a hexbeam.

Gordon, G3PXT [LS] was focussing on the CDXC MGM Challenge where he is the 2nd placed UK station. He found on 15m: *LUs, PYs x 50, CP6CL, VO1NE, 210CHI, BG0BBB, CO8LY, VP8LP, TR8CA, OY1OF, KG6DX, YBs, JAs., 5Z4VJ, 9K2OW, 8Q7PR, DU1JM, 5T5PA, 3B8CW, NP4JN, ZS1DX, FR4OO, J69DS, 4S7AB, 5H1FF, HS0ZGC, Ws, CX2CN, 9J2BS*.

David, G3WGN [LB] and other CDXC members reported good openings on 20m to the Pacific via short path from 0930 onwards. David worked 3D2AG and FK8IK and heard numerous JAs working the FK8.

Finally – thanks as always to my correspondents, to DX-World, 425 DX News and Daily DX. Please let me have reports and items for the next column by 0900 on Monday 26 October.

TABLE 2: 2020 worked DXCC entities, correspondents and top 3 UK RSGB from Club Log. Note last month's numbers accidentally included 6m so totals reduced this month.

Call	CW	SSB	Data	All
M0NKR	73	145	159	229
G4TUK	85	73	179	219
M1KMC	144	122	181	211
M0IQD		187		187
CT7AGZ	136		159	183
G3PXT	46	35	174	178
G0HDB	26		175	176
GI4DOH	148		38	166
G4XEX	92	76	133	163
G3SVK	153	72	1	159

Martin Atherton, G3ZAY
g3zay@btinternet.com

VHF/UHF

The autumn is upon us and this year's Sporadic-E season is over.

Here at G8FVK, the list of contacts on 6m during June and July looked like an HF bands log for 20m! This was undoubtedly one of the best seasons for DX that I can recall. My last significant contact on 50MHz was with VO1AW on 14 August.

During the waning of Sporadic-E (Es) on VHF, I decided to take a look at some of the other lower frequency VHF bands that some countries permit amateurs to use such as 5 and 8m. I was particularly interested in the 8m band (40MHz) that amateurs in Ireland, Slovenia and South Africa apparently have access to. It is said that this band has many things in common with 6m but displays better propagation characteristics via the F2 layer.

EI7GL has an interesting blog about this band and reports contacts in 2020 directly as well as cross-band with Slovenia, Denmark, Lithuania and Spain. Interested readers should take a look at ei7gl.blogspot.com.

Armed with this information, I approached John, G4SWX, the RSGB VHF Manager to see if there was any chance of UK amateurs being allocated this band. Unfortunately, he suggested that whilst Ofcom will grant UK amateurs temporary access to unused portions of the spectrum, if they can perceive tangible benefits, he thought that access would not represent a new and innovative use and in all probability would be regarded as 'more of the same', and that the RSGB would not be making a case for a 40MHz allocation.

I think interesting experiments could be conducted looking for propagation differences in a way somewhat analogous to the differences between 12m and 10m. No commercial equipment exists to operate on this band and so modification of existing equipment or the construction of appropriate converters would, to my mind, represent useful and interesting experimentation.

Also, I would not have thought that there would be anything to preclude UK amateurs organising cross band QSOs with those who do have such an allocation or invoking reciprocal licensing agreements when visiting countries permitted to use this band.

The views concerning possible 40MHz amateur operation expressed in the VHF/UHF column are those of the author, not those of the RSGB. In recent years, the RSGB has informally asked Ofcom about amateur access to 40MHz. Ofcom responded that this was not amateur radio spectrum, whilst they would agree to the continuation of the GB3RAL propagation beacon on 40MHz they would not agree to further beacons or general access to 40MHz by UK amateurs. Readers should also note that NoV access to unused spectrum at 71 and 146MHz was granted for innovative experimentation and not more of the same (CW/SSB/FM). The view expressed by Ofcom is that UK radio amateurs have adequate VHF/UHF spectrum for these traditional activities. John Regnault, G4SWX, RSGB VHF Manager

FIGURE 1: SSTV image from the ISS successfully decoded on 145.800MHz by Kevin, ZB2GI.

Reports

There has been a veritable cornucopia of reports coming in this month and I am very grateful to all the contributors.

Darrell, G0HVQ has sent in some very interesting reports for both 2 and 6m and, in common with others, testifies that 2020 has been an exceptional year for VHF. His *piece de resistance* was a contact on 6m with XV1X in Vietnam! I am most impressed and envious.

Darrell worked on 2m during a 'short tropo' opening to the south on 24 August, EA1SA and EA4GMY both in IN83. The Perseids meteor shower for him was a bit of a disappointment this year, he noted fading with no real discernible peak. In previous years he distinctly remembers a 3-4 hour peak with long 30 second bursts on 2m, but in 2020 he didn't observe one 30 second burst at all. However, on the 14th and 15th, he had an excellent tropo duct into LA/SM/OZ and worked a number of stations on FT8, with several new squares: JP20 (LA9AKA), JO49 (LA5VSA) and JO47 (OZ5AGJ). SM4GGC (JO69) was worked on FT8 but subsequently copied quite strongly on SSB.

In common with many, Darrell noted that the 6m Es season continued through August but, as expected, declined during the latter parts of the month. Nevertheless, there were some late-season surprises. For example, 6m opened to Kazakhstan on 23 August and to the USA on the 24th, with some strong signals out of the NW including the VO1ZA beacon on 50.039MHz. The opening hugged the coast with no stations decoded inland; his best DX was K4AWM in FM17. 6m was still going at the end of the month with a nice EU-wide Es opening on the 30th, stretching to 5B4 and 4X. Darrell was using 400W into a 6-ele Yagi.

Godfrey, G4GLM sent an interesting QRP report. During mild 'tropo' enhancement on 17 September, he worked Steven, 2E0PUT/P on the Isle of Wight on 144MHz SSB at 1853UTC running 3W PEP to a 'Big wheel' (3dB) omnidirectional horizontally polarised aerial. The signals were weak but steady with 100% copy in low noise both ways.

Jon, G4MCU has sent in an interesting report about tropo providing openings in mid-September into Scandinavia and the Baltic on 2m, 70cm and 23cm. He noted that conditions were first good on 17 September when he worked OZ on 23cm, but on 2m it seemed initially that the good propagation was bypassing the East Coast, with the West, Wales and Northern Ireland being favoured into Scandinavia. The highlights of these opening for him were QSOs on 2m with SM4GGC at 1183km and on 70cm SP1MVG who called him when he was just finishing with OZ1BNN. Poland was a new country on 70cm and obviously a new square. He was running 100W on 2m and 10W on 23cm with his IC-9700, and 50W on 70cm using his FT-991. All contacts were SSB, no digital modes!

In the mid two weeks of September, Steve, G4TRA also experienced exceptional long-distance tropo on 144MHz with the FT8 screen decoding signals from all over Europe, Scandinavia and extending into Russia. High pressure ridges dominated the Bay of Biscay, English Channel, North and Baltic seas almost permanently, whilst stations in EA, SP, OK, OZ, LA, SM, were worked, there were some even further away that made it into his log. For Steve, the memorable QSO was SM7BHM (JO76) at 1170km who was just using a small vertical and 50W.

Jim, GM3UAG, who is located 20km north of Aberdeen at IO87XJ, reports really

FIGURE 2: QSL card sent from XV1X to Darrell, G0HVQ confirming their 6m contact on FT8.

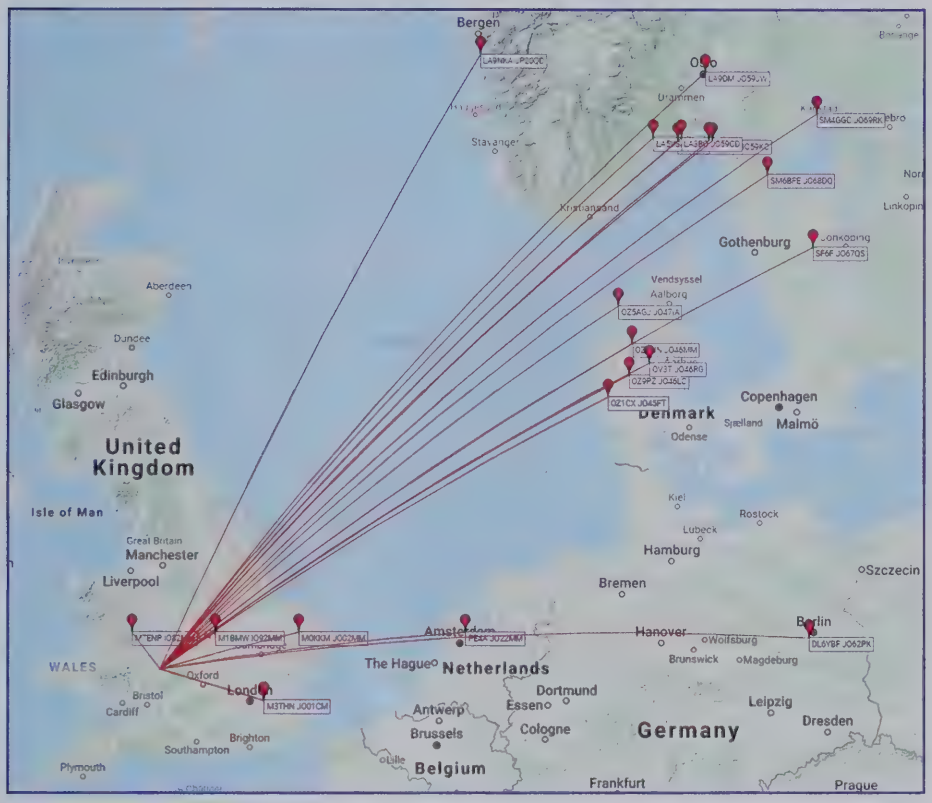

FIGURE 3: Map showing Darrell's contacts on 2m by tropospheric propagation on 20 August.

good conditions on 2m late afternoon/early evening of 17 September, which saw every FM channel occupied and GB3VHF rocketing in at S9. On 70cm, he logged all but one of our beacons at signal strength S9 for GB3UHF, S5 for GB3FNY, S2 for GB3LEU and even S1 for GB3ANG, which curiously is the nearest beacon to him. PI7CIS was coming in at S3. Similar conditions occurred again around midday on the 21st.

Rich, GD3YEO has sent in detailed report from the Isle of Man in which he makes reference to a ridge of high pressure over the UK, North Sea and Baltic producing a lift on 2m and 70cm into Northern Europe and southern Scandinavia in mid-September.

On the morning of 17 September, he found ON8NT on 70cm FT8, followed by 2½ pages of log, mostly on 2m, with contacts that included many DL, OZ, PA, ON, SP, OK, F, SM stations in squares from JN19, JO60, JO74, JO58 and a few on 70cm. He ended the night with SK6QA. OK1VVT was extremely strong on 2m for many hours up to +16dB. The action continued into the morning of the 18th in which Rich worked a page of the logbook before having a late breakfast – he's certainly got his priorities right!

All in all, Rich managed to work 82 stations in 9 countries occupying 36 squares on 2m and 21 stations in 9 countries on 17 squares on 70cm.

Kevin, ZB2GI has provided four very interesting reports of activity with which he was involved on Gibraltar. Moscow Aviation Institute hosted the Inter MAI 75 SSTV event on 4 August (1225-1810UTC) and the 5 August (0815-1825UTC). The activation periods coincided with ISS orbits over Moscow. ARISS transmitted the PD120 images on 145.800MHz FM. He received seven full images during four passes using a Yaesu FT-817 connected via a data interface to a Win7 Notebook PC running MMSSTV and a manually tracked 2m/70cm log periodic.

Kevin also reports activity from the Perseid meteor shower between 11 and 14 August on 2 and 4m. His 2m station comprised a FT-897 running 50 watts into a Cushcraft 5 2m/70cm (10dB) Yagi mounted on a 6m pneumatic mast and a 0-20dB preamplifier. He also used a Win7 Notebook PC running WSJT-X 10 with the radio connected via a data interface and an external USB soundcard. He coordinated his activities in the ON4KST chat room.

His list of contacts was (2m FSK441) IU8UZA (JN70), I3MEK (JN55), IW4ARD (JN64), F4VPC (IN87), EI3KD (IO51), 9H1TX (JM75), S52LM (65TX), I0NLK (JN62), IC8SQS (JN60), F6KBF (JN18BW), PA4EME (JO20), PA5Y (JO21), G1KAW (IO91), G4SWX (JO02), IK2JUG (JN45), EB5EEO (IM98), ON4KHG (JO10), DK5OX (JN59), DK5EW (JN48), ON5AEN (JO10), F6EAS (IN98), S51ZO (JN86), DM5TI (JN68), PB0AHX (JO22), G4TRA (IO81). And using FT8 on 2 metres, EA4DAU (IN70), EA7GPW (IM77), EA7P (IM76), EA8AR (IL18), EC4C (IM68), EA7CI (IM77), EA8DGZ (IL28), EA7IQT (IM66), EA5IEA (IM97). He contacted EB8AYA on 2m SSB. Armed with his trusty FT-817 with a Spectrum Communications 10m to 4m transverter and a 2-ele Yagi, he contacted EA8TX on 70MHz using SSB.

Kevin was very active during August on 50MHz using FT8 on his IC-7300 at home and logged over 90 stations.

Gibraltar ARS activated Europa Point Lighthouse ZB2LGT (GI 001) for the ILLW in August. Kevin, ZB2GI operated 2m FT8 and SSB using a Yaesu FT-897 running 20 watts with a 2m/70cm log periodic and on 6m with a 2-ele Yagi. He and John, ZB2JK operated satellite on AO91 and AO92. The society logged the following QSOs: 2m FT8: EA7BHO (IM87), EA7L (IM86), EA7TB (IM76), EA8RH (IL18), EA8A (IL18), EA7SL (IM76). 6m FT8: CN8LI (IM63).

Sign Off

This has been a truly astounding summer and early autumn for VHF and UHF enthusiasts. Whether it is a once in a lifetime phenomenon or whether we will see similar or better activity next summer, only time will tell.

Reports to radcom@rsgb.org.uk by 21 October for the December *RadCom* please.

Paul Marks, G8FVK
radcom@rsgb.org.uk
Reports by 21 October

GHz Bands

September Tropo DX

Some welcome tropo DX appeared in mid-September, which for once coincided with the 1.3GHz UKAC event on the 15th. Plenty of stations reported contacts well into Scandinavia, with G4ODA reporting a QSO with SK0CT at 1351km. Keith runs 400W to a 1.9m dish. In his comments he noted that "many signals were buried under radar interference and many UK G stations were unaware of the DX". Choosing instead to go for the numbers rather than distance maybe? I'm not that far from Keith but didn't copy SK0CT when I tried shortly after the contest so maybe the ducting was quite geographically selective or my low lying QTH put me under the duct. Conditions on the higher bands were excellent that night; I've never heard G3XDY as strong on 3.4GHz and we only just failed on 24GHz around midnight. Sadly, activity was extremely low after the end of the contest, everyone seemingly switching off and going to bed without checking the higher bands. A new condition? Contest fatigue?

PHOTO 1: GW1EHF/P's Cassegrain dish for 122GHz looking towards England and the new Severn crossing (courtesy G1EHF).

122GHz activity continues to boom

The first GM to G contact on 122GHz took place on 25 July between GM8BJF/P (IO85UP00MP) and G4BYF/P (IO85UP00TR) at 59+ both ways [1]. On 4 August, Noel, G8GTZ/P, Dave, G(W)1EHF/P and Neil, G(W)4LDR/P set up on opposite sides of the Severn Estuary to make the first G to GW contact on the band. The path to GW1EHF/P and GW4LDR/P passed under the new bridge. At 1240UTC G8GTZ/P transmitted a CW beacon that was immediately heard by Neil, GW4LDR/P. Dave quickly acquired Noel's signal with his higher gain dish. Dave and Noel then completed a fully quieting FM duplex contact followed by Neil (but at slightly lower signal levels due to the use of a non-optimised 30cm offset dish). The distance was 4.4km. I'm looking forward to the first cross-channel QSOs and QSOs from GM to GI and GD soon, when conditions permit.

On 13 September Bob, G4APV/P and Barry, G8AGN/P made what is believed to be the world's first Hellschreiber contact on 122GHz. Both stations used VK3CV transceiver boards. Bob used a 20cm horn and Barry used a 30cm offset dish. DX was about 2.5km but 59 reports were given both ways.

24GHz update

G3XDY continues to explore 24GHz. Since his initial QSO with me at the end of July we've had a mixture of successes and failures over the very obstructed 72km path between us. He's now worked 3 squares by adding Phil, G0JBA over a mainly sea path to JO01 at a little over 90km under fairly normal conditions. He's worked Robin, G8APZ (also in JO01) and broken the 100km barrier with Keith, G0ODA in IO92WS at 120km. Beacons GB3MHZ, GB3CAM, and GB3PKT have been heard so far. John runs a DB6NT mixer with Millitech amplifier giving about 2.5W at the feed. Antenna is a 48cm prime focus Procom dish with matching feed. On the Rx side there is a DB6NT LNA and another amplifier stage into the mixer. Like all of us, he's finding 24GHz HUGELY different from 10GHz, with non-line of sight QSOs proving a real challenge, but it's nice to see a revival of 24GHz in East Anglia – and it shows the positive effects of building beacons!

Beacon news

After two years of problems and frustration Per, DK7LJ has his 24GHz EME station QRV. Per is responsible for the game-changing DL0SHF 10GHz Moon beacon and this new system is also designed for beacon use. Located on the same site as DL0SHF, the 24GHz system runs up to 110W to a 3.7m dish. In continuous beacon mode it will not run with the QRO TWT but with a solid-state PA at much lower power. The Tx is remotely switchable between the solid-state PA and the TWT. Per says he'll run the beacon with the TWT on request, but only for a limited time and, for safety reasons, not before moon has reached a "reasonable elevation".

Back to earth and real-world problems at GB3PKT (JO01MT) continue. Beacon keeper Tony, G0MBA has fitted yet another filter, this time on the indoor driver unit's 108MHz output feed. We concluded that the interference from the co-sited 10MHz WSPR beacon was getting back in to the GB3PKT's RDDS via the long IF cable to the outdoor multiplier and PA, sending it out of lock. Combined with a new coax feed to the 10MHz antenna and a complete rebuild of the WSPR beacon, fingers crossed it seems to be behaving as I write this in mid-September. Running multiple radio systems on a structure built during the Napoleonic Wars, on a sand spit, with no local mains earth has proved an engineering nightmare! Beaconspot.uk [2] lists the current status of all beacons.

Denis, G3UVR, SK

Finally, September brought the sad news of the sudden passing of Denis, G3UVR. He was a regular in the UKAC contests on all bands to 13cm plus 10GHz. Operating on this band from his home on the Wirral with a dish pointing out of his bedroom window, he was always available for a QSO outside contests when he sniffed good conditions. He'd recently set up the dish for 3.4GHz and I was pleased to make the one QSO with him on the band. Denis was always a pleasure to work on CW and a real gent when you met in person. His Morse skills were peerless and a pleasure to work at a good speed. RIP Denis, IO83 is going to get harder to work on the GHz bands now you're gone.

Websearch

[1] https://bit.ly/33Bhj18

[2] https://www.beaconspot.uk/beaconm.php

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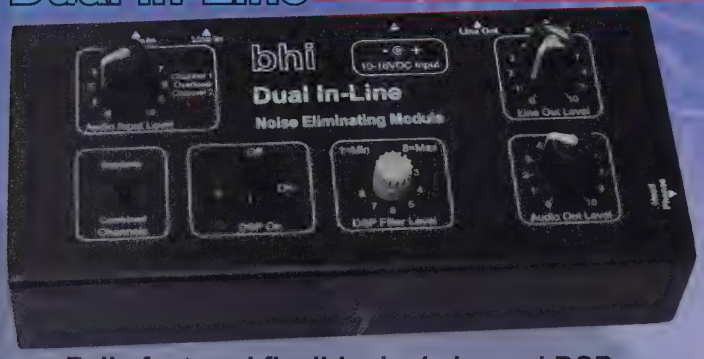

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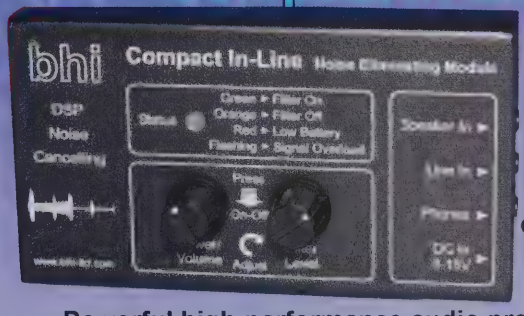

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Young people to discover the world of amateur radio

On Saturday 20 June, I was tuning the VFO with the piece of wire that hangs from my balcony and heard very young voices. In an era where the average age of amateur radio is still 'pensionable', I was hearing young operators under the careful supervision of their amateur radio parents. Rebecca, Emma, Chantal, Jacopo and Federico were kind enough to tell me later all about their radio day.

Rebecca: "I am 8 and a half years old and live in Reggio Emilia, Italy. I really liked the experience with the radio of my dad (Enrico, IU4LEC). I am sorry that I had so little time to talk. I felt very excited when I was answered from other countries in other languages, I had hoped to speak with Italians but I couldn't.

Emma: "I am 12 years old; I live at Pranzo in the town of Tenno near Riva Del Garda in Trentino, Italy. On the occasion of Kids Day I was able to transmit with the callsign of my dad (Ivan, IN3RFL). In the past I had the opportunity to talk with friends of my dad in the 40ch CB. I also loved trying telegraphy during a 2018 alpine event in Trento with Salvatore, IZ1BWB. But Kids Day was different because there are special rules to follow. I would be able to listen to more people so I was very excited."

Chantal: "I am 10 years old and I live in Villa Lagarina near Rovereto in Trentino, Italy. I had so much fun with dad (Cristian, IN3EYI). Since I was little I always saw him behind the microphone talking with many people together with my brother Martin who is now IN3IBW. Now it was finally my chance too; I was very excited when many people answered in many languages, I had a pile up in moments and I got confused. Luckily dad was there by my side and helped me; I hope soon to repeat this adventure."

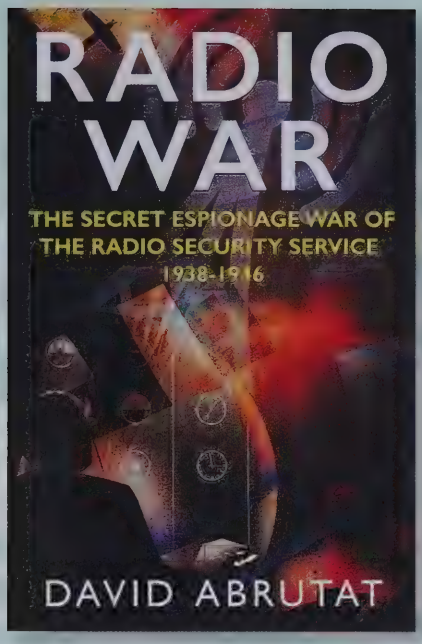
Jacopo: "I am 11 years old and I live in Prato, Italy. During Kids Day I broadcast alongside my cousin Amelia, IU5LVM. I really liked the activity and it was fun to broadcast on the radio because I like to talk to new people and know them."

Federico: "I am 11 years old and I live in Carpi with my family. I liked this initiative very much because it bought children in to the amateur radio world. In my case, my grandfather and father are both radio amateurs and have taught me the basics. During the Kids Day, many people of all ages were able to speak to me. I was thrilled to take part, but I was also nervous with the first few contacts – using a foreign language and phonetic alphabet for the names. For me, who was born in the digital and internet age, this has made me rediscover a technology born many years ago. I believe that these initiatives should be supported more, in order to continue to keep alive this communication system, which has proved to be essential in emergency situations, when modern devices have sometimes failed." (Note of the grandfather IK4HLV, when Federico comes to my house always asks me to do satellite activity, since I do not have automatic tracking of the antennas is he who manages them and is very fascinated by the radio world, I hope it continues so!)

I spoke to the Italian National Councillor and Coordinator of the Ari Radio Club, Cristian, IN3EYI, who said, "Kids Day on 20 June was a great opportunity to give young people a moment to experience our hobby. The ARRL runs Kids Day twice a year to promote amateur radio for young people anywhere in the word. Kids Day is designed to offer an on the air experience to young people in the hope of getting them on the radio and getting their own licence. It also gives adults the opportunity to share their station and love for amateur radio. I confess that, initially, I was skeptical about the Italian participation of very young operators, yet I was amazed. It encourages me even more to work and engage with others in the projects on which I work daily related to young people like the YOTA project. We are also working with schools and Scouts. I hope the participation in the next Kids Day is greater."

After this, I think that radio is *not* dying. On the contrary, I believe that these activities should be carried out more frequently and perhaps encourage all of us to involve young people in the world of amateur radio.

Antonino Spagnolo, IU3KIE
iu3kie@gmail.com



Radio War

The Secret Espionage War of the Radio Security Service 1938-1946

By David Abrutat

If you have every wondered what Radio Amateurs did during WW2, then this new hardback book will be a revelation. Many books have described the work of Bletchley Park and even the work of GCHQ and SIGNIT but *Radio War* extends this into the work carried out by that voluntary interceptors (VI) many of whom were radio amateurs and RSGB members. It does not stop there either as it describes the secret operations, the stations used and so much more.

During the Second World War German intelligence had deployed wireless teams throughout occupied Europe. Agents had even been deployed to mainland Britain to spy on British military activity. Monitoring and reporting of their wireless transmissions fell to a small, secretive and largely unknown unit manned almost exclusively by volunteers. The VIs would spend hours every day at home monitoring the short wavelengths for often faint and difficult to copy signals transmitted by these German secret intelligence services. This unit was to become known as the Radio Security Service (RSS) and was at the core of the signals intelligence production effort at Bletchley.

Without interceptors like the RSS, Bletchley would not have existed. Their story has never truly been written before but *Radio War* focuses on their secret world of wireless espionage. There is included an honour roll of RSS operatives which details their area of operation, callsigns, locations. Not surprising this list is packed with well-known radio amateurs of the day including at least one RSGB president. Patrick Reilly, the Assistant to Head of MI6 Stewart Menzies, was to say of the RSS `a team of brilliance unparalleled anywhere in the intelligence machine.'

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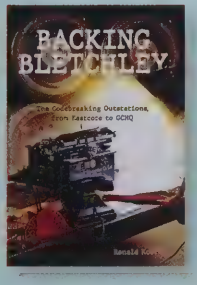

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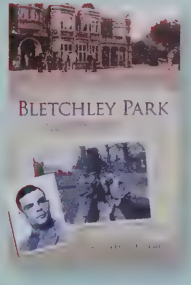

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VDSL

Shefford & District Amateur Radio Society get to grips with the problem of VDSL.

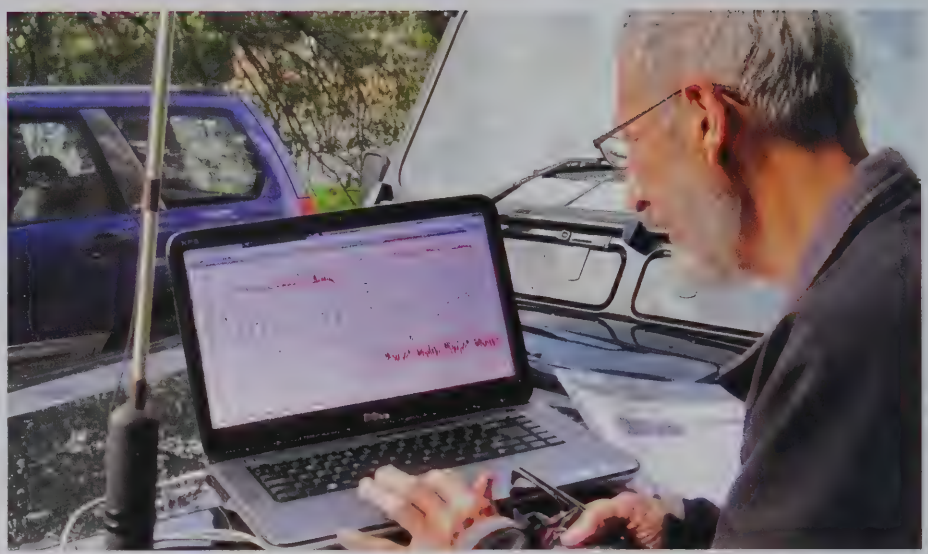


PHOTO 1: G1GSN, looking at the Lelantos graphs at the QTH of G8UOD.

In May this year, the RSGB sent out a 'Call To Action' from Dave Wilson, M0OBW, the President of the RSGB. The message was clear; any amateur who was suffering from VDSL interference should let Ofcom know. It was very clear that support from the amateur community was needed to identify the problem. The information needed to help identify the QRM was provided in the article, including how to get Lelantos software.

In the September issue of *RadCom*, the feedback from Steve Carter, G8EPA indicated that the expected response was too low; just 77 formal complaints to Ofcom. Not enough for Ofcom to engage with BT Openreach to negotiate a means of resolving VDSL problems. Because of the low response, the club started to think about purchasing a SDRplay receiver. The idea being to pass it on to those club members who would want to check their QTH for VDSL.

The membership were contacted to find out how many had SDR equipment and could also download the Lelantos software. Some felt that because they lived in an area where the communication cables were underground they would not have a problem, others had no SDR equipment and some were only interested in VHF/UHF bands. Paul, G1GSN came up with the idea that instead of expecting individuals to try and test for VDSL he would visit members' QTHs and, using a laptop loaded with Lelantos, SDRPlay equipment and a portable aerial, there he would carry out the tests.

Steve, G8EPA gave some good advice about using a mobile antenna and guidance for the results shown on the graphs.

For the initial test, David, G8UOD's QTH was chosen due to the close proximity of two Openreach fibre and twisted pair cabinets and a telegraph pole with several drop-wires radiating in all directions. A mobile antenna with a counterpoise worked well. The Lelantos software produced graphs that clearly indicated the presence of VDSL (**Figure 1**).

Having a mobile system that can detect VDSL – albeit one successful detection – was an encouragement to visit all club members of the Shefford & District RS and gather information about those affected by VDSL. This would ensure that those without SDR equipment wouldn't be left out of the scheme and also gave Paul the opportunity to become experienced in using the setup, **Photo 1**. The mobile approach ensures that social distancing can be maintained.

It is hoped that a set of results showing the various levels of VDSL can be produced for several areas in our region. These results can be passed on to both the RSGB and Ofcom in an attempt to resolve the issue of VDSL interfering with amateur radios and enable the EMC committee to have some further data to help them get a resolution to the problem.

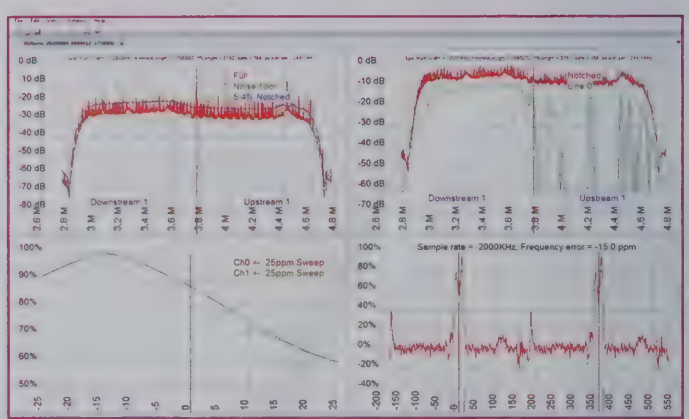


FIGURE 1: Results from G8UOD's QTH.

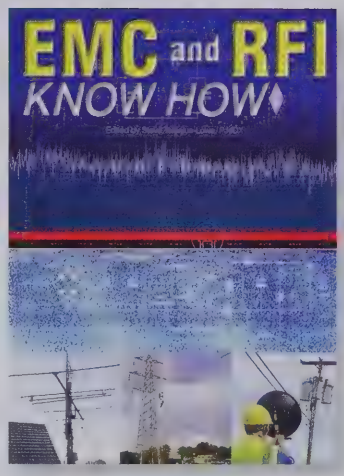
David Lloyd, G8UOD
davide.lloyd@ntlworld.com

Steve Carter, G8EPA commented, "The EMC Committee welcomes any initiative that helps to identify the extent of VDSL interference and allows us to provide additional data to Ofcom to support our case. This approach by members of Shefford & District Amateur Radio Society provides an efficient and cost-effective way to quickly survey the level of VDSL signals at a number of different sites, whilst also permitting social distancing in these challenging times. We know a number of other individuals and clubs who are sharing equipment and expertise to help others collect data. We thank them for their efforts and encourage others to do likewise." To read more on the subject of VDSL, you can read the article in the May *RadCom* (pages 18-20) or you can go to the RSGB website at www.rsgb.org/vdsl-reporting. If you need further help in how to identify VDSL interference, to make the necessary measurements, to interpret the results or how to submit the complaint to Ofcom, then members of the EMC Committee are available to provide additional assistance. They can be contacted by email to vdsl.help@rsgb.org.uk.

Book Review

EMC and RFI Know-How

Compiled & edited by Steve Telenius-Lowe, PJ4DX



Electromagnetic compatibility – 'interference', to the layperson – has been an issue to radio amateurs since, well, forever. Even back in the 1950s there were adverts selling and articles for making 'TVI-proof' transmitters!

After a number of occasional articles by different authors, *RadCom's* EMC column was started in 1989 by Hilary Claytonsmith, G4JKS and the present columnist Dr David Lauder, GOSNO took over in 1996. Although the technologies have changed, many of the core concerns remain.

This book is a collection of EMC articles from the UK, USA, Germany, Greece and The Netherlands. They cover a wide gamut of interference-related topics and are sensibly grouped into a dozen or so category-chapters such as locating & eliminating RFI, PSUs & chargers, xDSL interference, problems with LED and other lighting, and many more. Each chapter is a mix of things like case reports, practical tips, theory and practical steps that can be taken.

One article I particularly liked related how a 5GHz-band professional data link caused Harmful Interference to a mobile phone system operating at 780MHz. The cause was a strange one and although the necessary corrective action was straightforward, we also learned how good old-fashioned amateur radio improvisation was used to prove the fix was working properly.

On that topic, the book concludes with a selection of homebrew projects for building several EMC-related items of test and related gear, including RFI-hunting equipment, an RF current probe, ways of reducing interference from strong broadcast signals and even a noise-eliminating aerial system.

Also available on amazonkindle

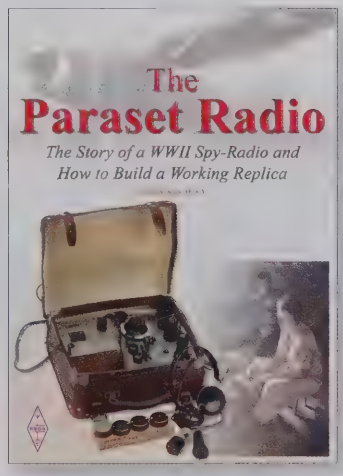
EMC and RFI Know-How provides the reader with a fascinating look at a huge number of different interference-related topics, sensibly grouped, and all from highly reputable sources. Whilst not being a 'how-to' handbook, it is precisely the sort of very readable publication that promotes a greater degree of background information from which one can learn a huge amount. Definitely one to consider.

Size 174x240mm, 208 pages, ISBN: 9781 9101 9396 9
Non Members' Price: £13.99, RSGB Members' Price: £11.89

The Paraset Radio

The Story of a WWII Spy-Radio and How to Build a Working Replica

By Hiroki Kato, AH6CY



This book gives you precisely what it says on the tin. I mean, on the cover.

Starting with an historical background that sets the scene around the invasion of Europe and the early days of the Special Operations Executive (SOE), we then learn how SOE agents operated behind enemy lines, including how they got there and how they communicated. This leads rather neatly on to a discussion of the radio equipment used by SOE agents in the field plus circuit diagrams of several types.

The second part of the book describes in detail how to build your own replica Paraset. Whilst it's a rewarding pursuit it's not for the faint-hearted because even tracking down the necessary parts can be challenging. Fortunately, this well-researched book mentions some people who stock (or make from scratch) a number of the trickiest bits. You'll also find dimensioned engineering drawings of critical items ranging from the front panel to the Morse key plus a lot of tips and tricks, all of which give the determined constructor a fighting chance of making a really authentic replica. But if that seems like too much hard work, there's also a section on building Paraset look-alikes using modern parts. Some of these very carefully retain the original look-and-feel, one going so far as to hollow-out old valves and insert their semiconductor equivalent! Even if you're not so interested in building a replica Paraset, there are odd little gems that you'll find have a much wider resonance.

Also available on amazonkindle

The Paraset "works as a practical QRP radio on 80 and 40m", the book says in its final chapter, but admits it is "not the most stable or easy radio to operate". That said, it goes on to describe actually using Parasets – replica and otherwise – on the air, with a special mention of the ARRL Straight Key Night that takes place on New Year's Day and when lots of old gear (including Parasets) gets dusted off and put on the air.

I was interested to see a number of appendices including details of the 'Playfair' coding scheme (cipher) used by SOE, a list of the 20 or so surviving original Parasets plus a comprehensive bibliography.

Whether or not you *think* you're interested in this venerable design that was so important in the War, I guarantee you'll take something away from this book.

Size 174x240mm, 88 page, ISBN: 9781 9101 9395 2
Non Members' Price: £8.99, RSGB Members' Price: £7.64

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Introducing the archive of the Institution of Engineering and Technology

The Institution of Engineering and Technology (IET) is the largest professional membership body for engineers in Europe, with over 168,000 members in 150 countries.

The IET was formed in 2006 with the merger of the Institution of Electrical Engineers (IEE) and the Institution of Incorporated Engineers (IIE). The IEE had previously merged with the Institution of Electronic and Radio Engineers (IERE) in 1988 and the Institution of Manufacturing Engineers (IMfgE, previously IProdE) in 1991. A complete 'family tree' of the IET and all its predecessor organisations can be found on the IET Archives website at www.theiet.org/publishing/library-archives/the-iet-archives/iet-history/, along with further information on its history.

The IET's Library and Archive represents one of the most important collections on engineering, especially electrical engineering, in the UK. The collection began with donations of books and personal papers from its members and grew to a collection of publications, personal and corporate archives and rare books covering a wide variety of topics in engineering and technology. The Institution appointed its first Librarian in the 1870s and the collection is still being added to today. The first Archivist was appointed in the 1970s. In 2003, the Library, Archive and Rare Books collections were awarded Designated status, an Arts Council award that recognises outstanding collections held in museums, libraries and archives in England.

This article describes a selection of the IET's collections relating to the history of radio. The selection includes personal collections donated by an individual or their family, company archives and papers created by the IET and its predecessor organisations. It is not an exhaustive list, and for more information on all the collections please visit www.theiet.org/library and follow the links to the online Library and Archive catalogues.

PHOTO 1: Landikotal Frontier Brigade Group Signal Section: WS 22 on pack.

Personal collections

Papers of Sir Henry Norman (SC Mss 143): *Papers from the career of Sir Henry Norman, Chairman of the War Office Committee on Wireless Telegraphy (1903-1939).*

This collection of the papers of Sir Henry Norman is typical of the personal collections held in the IET Archives. It contains correspondence, reports and committee papers concerning the early history of wireless, including an account of the Marconi Scandal of 1912, when it was alleged that members of the British Government had taken part in insider trading due to their knowledge of an important contract that was about to be awarded to the Marconi Company. The collection also covers the organisation of the wireless network after the First World War, when Sir Henry was appointed to the Imperial Wireless Committee and the Broadcasting Committee.

Proudlock Collection (SC Mss 50): *Photographs taken by Lt. Col. R V Proudlock while serving with army signal corps in India, Pakistan and Afghanistan, 1946-1949.*

This collection comprises 15 albums of photographs showing all aspects of the construction and maintenance of telegraph and wireless systems in India, Pakistan and Afghanistan between 1946 and 1949. Proudlock not only photographed equipment and installations, he kept a remarkable photographic record of life at the time of the partition of India, during which up to 2 million people were killed and an estimated 14 million were displaced, Photo 1 and 2.

PHOTO 2: Sign on the Khyber Pass.

Papers of E S Megaw (SC Mss 307): *Personal papers of Eric Megaw concerning his career and his interest in amateur radio (1908-1995).*

The Archives contain several collections relating to the history of radar in the Second World War, in particular the development of the cavity magnetron for the purposes of airborne and shipborne radar. Megaw was a notable contributor to this work, but this particular collection relates to his personal life and his interest in amateur radio. It includes QSL cards, notebooks and press cuttings. Megaw was a member of his school's wireless society, and from the age of 15 he achieved several firsts in amateur radio: being the first person in Ireland to pick up a signal from New Zealand; the first amateur to transmit a radio message in Ireland; and the first to communicate between Ireland and Australia. The collection

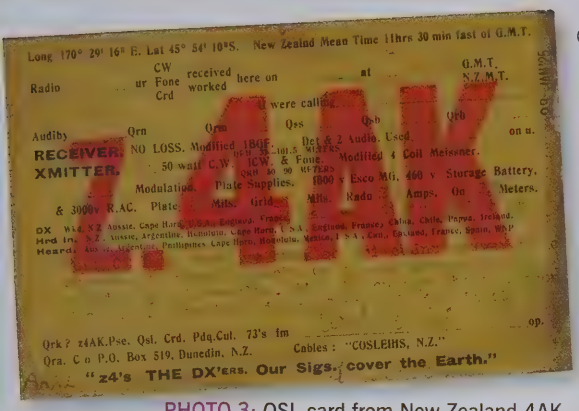
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PHOTO 3: QSL card from New Zealand 4AK.

PHOTO 5: 4403H operator's headset 1946.

includes nearly 1000 QSL cards, collected by Megaw between 1924 and 1931, **Photo 3**.

Company records

Standard Telephone and Cables Ltd. Papers (NAEST 211): *Papers and photographs relating to STC's New Southgate factory (1880-1995)*

This collection of photographs and other records relating to STC's New Southgate factory was given to the IET Archives in 2009. It includes a large number of photograph albums documenting STC's staff, installations and the technology used. These photographs are a fascinating technical and social history of the company and the people who worked there. A further deposit, comprising STC reports written by Stan Springer and unidentified photographs, primarily of the STC site, was made in 2010 by the Barnet Local Studies library. **Photo 4** and **5**.

Papers of Decca Navigator (NAEST 228): *Records of the Decca Navigating Company (1912-2015)*

The Decca system of radio navigation for ships was originally developed by the engineer William J O'Brien and was passed on to the Admiralty in 1939 by Harvey Schwartz, Chief Engineer of the Decca record company. The system, known as QM, was adopted in 1944 and used in the Normandy landings. Decca Records formed the Decca Navigating Company in 1945 and the company expanded its reach into navigation equipment for commercial shipping and aircraft. This collection is not a formal company archive but a series of records kept by senior members of staff. It includes company records, technical reports and a complete set of Decca Navigator's in-house magazine, which was published between 1949 and 1981, **Photo 6**.

PHOTO 4: Audio equipment at Liverpool Cathedral.

Archives of the Women's Engineering Society (NAEST 92): *Corporate records of the Women's Engineering Society (1919-present)*

The Women's Engineering Society was formed in 1919, following employment of many women in technical posts during the First World War. While most of these women had to leave their jobs at the end of the war, some wished to continue careers in engineering and came together to form WES. Electrical engineering, as a relatively new discipline, was seen to be more open to accepting women in the workplace (the IEE was the first engineering institution to admit women as members). The WES journal, *the Woman Engineer*, contains a great deal of biographical information on its members as well as technical papers and accounts of visits and events, **Photo 7**. The *TWE* has been digitised and is available on the IET website at www.theiet.org/publishing/library-archives/the-iet-archives/online-exhibitions/women-and-engineering/.

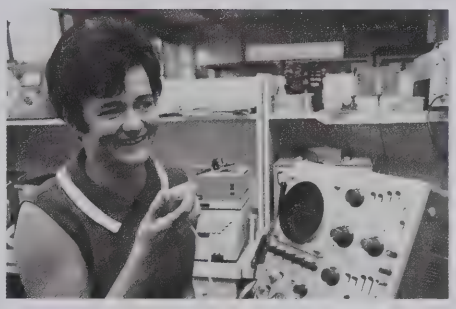
PHOTO 7: Elizabeth Laverick, Technical Director of Elliot Automation.

Institution records

Archives of the IET: *Corporate records of the IEE and IET (1871-present)*

While the IET's records cover the full spectrum of engineering and technology, the first specialist technical group formed in 1919 was the Wireless Section, following pressure from members working in this area. The increasing specialisation of radio and electronic engineering led to the formation of the Institution of Wireless Engineers, later merged with the IEE (see below). The IET Archives include early papers on wireless technology submitted to its journal, membership records and records of committees, including joint committees on radio interference. **Photo 8**.

Archives of the Institution of Electronic and Radio Engineers: *Corporate records of the IERE (1931-1990)*

The IERE was founded as the Institution of Wireless Engineers in 1925, then quickly changed its names to the Institute of Wireless Technology (IWT). In 1941, it joined with the Institution of Radio Engineers (IRE) to form the British Institution of Radio Engineers, later the IERE. It had over 10,000 members by 1970. In 1988, it merged with the IEE. The collection includes corporate records and some membership records, although these are far from complete.

How to find out more

Online catalogues for both the library and archive collections can be found at www.theiet.org/archives. At the time of writing, we are closed to visitors but are operating a remote enquiry service. You can also explore the collections via our blog at https://ietarchivesblog.org/, online exhibitions and biographies at www.theiet.org/archives, and images which are hosted on Pinterest www.pinterest.co.uk/ietarchives/ . We are also active on Twitter @IETLibArch.

Anne Locker
Library and Archives Manager
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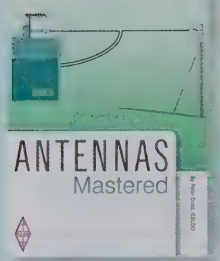

Antennas Mastered

By Peter Dodd, G3LDO

This book brings together, in a scrapbook format, a collection of antenna articles from over the years that have appeared in *RadCom*.

Antennas Mastered is packed with everything imaginable connected with antennas. Practical solutions that cover all bands, antenna types, ATUs, Meters, Software and much besides.

You will also find several standalone articles written for *RadCom*, the first of these being a method of modelling HF antennas using VHF antennas, written in December 1972.

Organised in the order they were written *Antennas Mastered* provides a look at the practical side of antennas and the index provided allows the reader to access any specific subject.

Peter Dodd, G3LDO has created in his 'Antennas' column one of the best archives of antenna material available, *Antennas Mastered* provides this for everyone interested in antennas.

Size 210x297mm, 288 pages,
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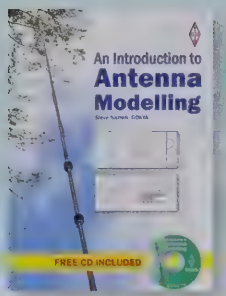

An Introduction to Antenna Modelling

By Steve Nichols G0KYA

For many years the only way for most radio amateurs to work out how well an antenna design would work was to build it and find out. The arrival of computer based antenna modelling programmes has changed this. This book looks at the Free MMANA-GAL antenna modelling program that will let you design and optimise a whole host of antennas, and all on your PC.

An *Introduction to Antenna Modelling* shows you step-by-step how to input antennas designs into MMANA-GAL, how to adapt designs you are given and how to optimise your designs for the best performance. By the time you have finished you should be able to model a whole host of antennas including dipoles, the G5RV, the W3DZZ trapped dipole, verticals, off-centre fed dipoles (OCFD), magnetic loop antennas and many more.

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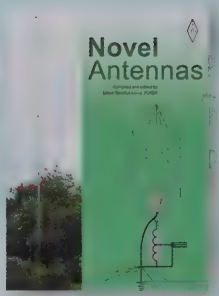

Novel Antennas

Compiled and edited by Steve Telenius-Lowe, PJ4DX

Radio Amateurs often experiment with antennas. But few have ever considered anything beyond the basic antenna designs - this book sets that right with a myriad of 'novel' antenna designs.

In this book, you will find the choke dipole; magnetic loops tuned by a variable inductance or a novel home-made capacitor rather than the usual vacuum variable; the 'Super Moxon', which adds a pair of directors to the standard Moxon Rectangle design; an orthoganally steered receive antenna that provides incredible levels of rejection of interfering signals; the home-made 'Wonder Whip' for QRP portable operation; a mobile antenna that can double as a car roof rack and, yes, the original Spiderbeam construction project described by its designer.

With material included from no less than 57 different authors it shows the ingenuity of radio amateurs around the world knows no bounds.

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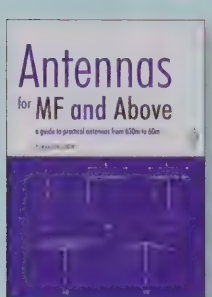

Antennas for MF and Above

By Mike Parkin, G0JMI

A practical guide to antennas for the 630m, 160m, 80m and 60m bands.

Aimed at the constructor, or those who are curious to understand in further detail theoretical aspects of antenna techniques, this book shows how you can use the same approach or even the same antenna to work two or more bands. There are examples of how a 160m antenna can be pressed into service on 630m or even 80m can be made to work on 160 and 60m.

You will find examples of single band and multi-band working designs for both vertical and horizontally polarised antennas. There are explanations of the operation of antennas with radiation pattern diagrams used to help with understanding the concepts introduced. *Antennas for MF and Above* is a standard reference work and THE practical guide for everyone interested in antennas for the amateur bands from 630m to 60m.

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Edited by Giles Read, G1MFG

This book sets out to provide a huge array of designs that the home constructor can attempt.

This book starts with the premise that it will provide all the information needed to construct the antenna so it is at your fingertips when you start. Broken into sections *60 Antennas* provides designs from the simple to the complex but still achievable for the home constructor.

There is not enough space here to list all the antennas, or their variations, included in *60 Antennas*.

Selected from around the amateur radio World and from some of the great names of antenna design there is much here that will inspire you to want build your next antenna.

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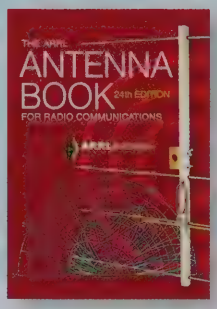

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Stealth Antennas *3rd Edition*

By Steve Nichols, G0KYA

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Aimed at everyone who has restricted antenna space, or feels they are radiationally-challenged *Stealth Antennas* should persuade anyone with licence that they can still work the world.

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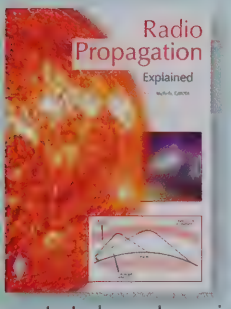

Radio Propagation Explained

Steve Nichols, G0KYA

Understanding radio propagation is essential for anyone with an interest in radio communications who wants to know how signals travel from A to B. *Radio Propagation Explained* provides everything you need to know about this topic.

Looking at HF to VHF, UHF and beyond *Radio Propagation Explained* provides practical understanding. It looks at the sun, sunspots, ionospheric propagation, ionospheric storms and aurora, tropospheric propagation, meteor scatter and space communications, including satellites and Earth-Moon-Earth signals. It also includes information on computerised HF propagation predictions, greyline propagation, low frequency (LF) propagation, sporadic E, amateur radio modes like WSPR, PSK and JT, web resources and much more.

Radio Propagation Explained is thoroughly recommended reading for everyone who wants to understand radio propagation.

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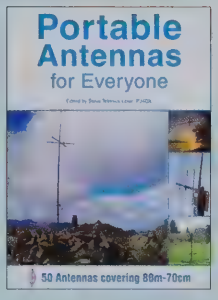

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Edited by Steve Telenius-Lowe, PJ4DX

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A Vertical with upright folded back counterpoises

PHOTO 1: General view of the completed antenna, mounted on a balcony well above 'true ground' and showing the counterpoise wires.

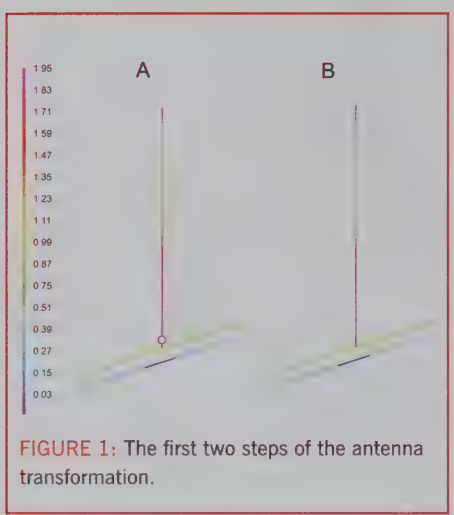


FIGURE 1: The first two steps of the antenna transformation.

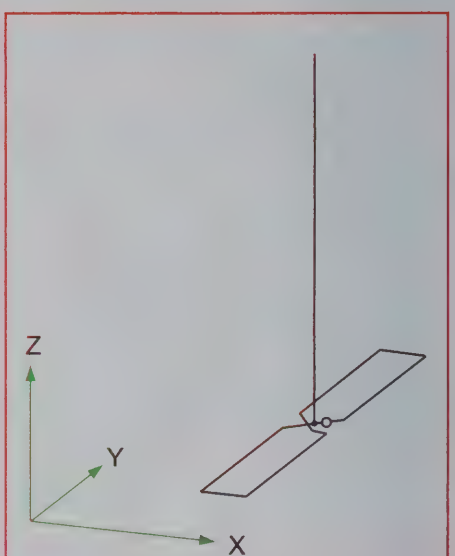


FIGURE 2: The third step of antenna transformation – twisting the looped counterpoise.

Introduction

The well-known rule is that every vertical antenna requires either ground radials or a system of counterpoises. The designs that apparently do without them actually use the coax shield as a disguised counterpoise. If you do not want your coax to be a part of the transmitting antenna (and that's my standpoint) then you normally need to either lay down radials or install elevated counterpoises – provided that you have enough space available around your vertical radiator. But what if none of these options is very feasible for you? As you will see, you can still construct a vertically polarised omnidirectional monoband antenna but you need to arrange the counterpoises in a not-so-obvious way. In this article, I am presenting such an antenna. I have not only designed it, but I have built it and verified its performance. And it has met my expectations completely.

Electrical design and simulation

The antenna is in fact a significantly transformed ¼ wave ground plane with two counterpoises. **Figure 1** shows the first two steps of this transformation.

Both counterpoises are folded in half and their ends are connected together, as you can see in Figure 1A. We can do that because their ends are exactly at the same RF potential. In this way, we no longer have two straight horizontal counterpoises but rather a counterpoise loop. The second step of the modification is to move the feed point from the bottom of the vertical radiator to the beginning of the counterpoise loop as shown in Figure 1B. Due to that the antenna feed point impedance is increased four times. It is important to note that the current distribution over all antenna wires remains unchanged. You can clearly see that in Figure 1 in which current magnitude is shown coded in colour. But mind that this trick works only of we use the counterpoise loop rather than the classic open-ended counterpoises. Greater feed point impedance will simplify the antenna matching network – but more on that later.

The next step is twisting the counterpoise loop as presented in **Figure 2**. Please note that the conductors crossing below the vertical radiator must not touch one another. Enough air separation or additional insulation between the wires must be provided.

Finally, we bend up both ends of the twisted counterpoise loop. **Figure 3** shows the loop ends bent by about 45° but the

PHOTO 2: Details of the lower mounting plate and the counterpoise-balun-radiator connection. The balun assembly (white box) is secured to the mounting plate via its terminals.

PHOTO 3: The upper plate and the tube holder used for attaching the plate to the aluminium radiator. Notice a short section of thicker 25mm OD tube slid over the thinner 20mm OD tube to match the holder diameter.

process is continued until both halves of the counterpoise loop are in the upright position in parallel to the vertical radiating element.

Practical embodiment

I decided to design and build such an antenna for the 20m band. But, of course, it can be re-scaled for another band. The final design for 20m band is shown in **Figure 4**. The antenna is 6.8m tall, which is 0.32λ on this band, so it *is* a little taller than the initial ¼λ ground plane antenna. The radiator had to grow because of the influence of the counterpoise system positioned in close proximity. But note that the antenna footprint has been greatly reduced, to just a square of 13 x 13cm! There are four wires running in parallel to the main radiator and all of them are 2.55m long.

Figure 4 emphasises the need for a gap between the wires crossing near the feed point. In my prototype I made one of the crossing wires some 20cm longer than the other one to create a sag.

Simulations

One must be very careful when simulating this antenna. Due to the fact that the vertical radiator is built with relatively thick tubes and the counterpoise with rather thin wires (and they are in parallel and close to one another), NEC-2 based simulators like 4nec2 and EZNEC will **not** provide accurate results. Fortunately, the MININEC based MMANA-GAL predictions are much closer to the reality so I recommend using this program for modelling the vertical with upright folded back counterpoises.

When simulated 1.5m above the ground the antenna had feed point impedance 53Ω. You can understand now why I moved the feed point from the monopole bottom end to the counterpoise. Otherwise, I would get an inconvenient 13Ω impedance.

The maximum gain equals -0.25dBi at 21° take-off angle. By comparison, the ¼λ ground plane with two horizontal counterpoises at the same height above the ground has the feed point impedance 33Ω and a maximum gain of -0.13dBi at 22° take-off angle. Both antennas are omnidirectional. We may say that the antennas are practically equal in terms of gain and radiation pattern. The feed point impedance of the folded counterpoise version though is easier to match to 50Ω coax.

There is yet another important parameter one should take into account when

FIGURE 3: The fourth step of the transformation is bending up the ends of the looped counterpoise.

Jacek Pawłowski, SP3L
sp3l@wp.pl

PHOTO 4: Bottom view of the lower mounting plate. One of the crossing wires is visible. The other wire crossing is above the plate so there is no risk of a short-circuit or voltage breakdown. By adjusting the length of the visible wire you can fine tune the antenna in its final position.

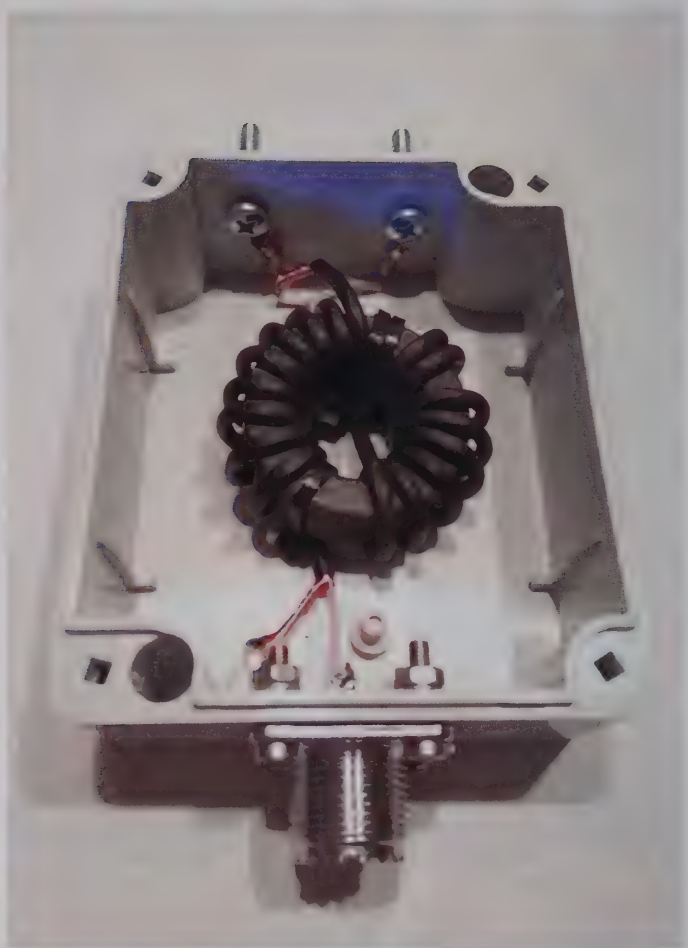


PHOTO 5: The interior of the 1:1 current balun.

comparing two antennas – their bandwidths. The MMANA-GAL simulations revealed that the SWR=2:1 bandwidth of the ground plane was 620kHz and the folded counterpoise version's SWR=2:1 bandwidth was 490kHz. This is a very good result. Bringing counterpoises close to the main radiator almost always leads to very narrow bandwidth. But not in the case of this antenna!

Construction

The main radiator was made of five 1.5m long aluminium tubes of the following outer diameter (OD) and wall thickness in millimetres: 25/2, 20/1.5, 16/1, 13/1 and 10/1. Using a hacksaw and a vice I slit every tube (except for the thinnest one) at one end. The tubes were then slipped one into another and their junctions were secured with hose clamps. As you can easily calculate, the average tube overlap at every junction was 175mm. Actually, I made a larger overlap (200mm) at thicker tubes junctions and smaller overlap (150mm) at thinner tubes junctions.

I used bare copper stranded wire 2mm in diameter for the counterpoise loop. In order to keep the wires in the intended position, I used two mounting plates. The mounting plates are made of polyamide and their dimensions are 150 x 150 x 5mm. Any other isolating materials suitable for outdoor RF use can also be employed for the purpose. Right in the centre, they have a hole of 26mm diameter that I drilled with a hole saw. There are four holes drilled in the vertices of a 130 x 130mm square in every plate for positioning the counterpoise wires. The mounting plates are almost identical but the lower plate has two additional holes to match the terminals on the balun enclosure so that it can be mounted conveniently. The lower plate is shown in **Photo 2** and the upper one in **Photo 3**.

One can use various methods to attach the mounting plates to the radiator. I decided to use round tube holders made of chrome plated aluminium. Such holders are often used as hangers for hanging garment rail tube. The most commonly available holders I found in the online shops were for 25mm OD tubes. This fact was crucial for choosing the diameter of the thickest bottom tube for the radiator. There are three mounting holes drilled around the central hole in every plate for attaching the holder.

The lower plate is mounted on the 25mm OD tube and everything is mechanically well matched. However, the upper plate had to be mounted on the thinner tube of 20mm OD. To avoid the mismatch between the diameter of the tube and the tube holder, I increased the tube diameter by sliding a short section of 25mm OD tube over the 20mm OD tube in the place where the upper mounting plate was to be fixed. If you take a closer look at the photograph showing the upper plate, you may see it.

As you can see in Photo 2, the copper wires are connected to the main aluminium radiator with the help of a steel clamp with a screw terminal. Thanks to that, there is no direct copper-aluminium connection (which could trigger electrochemical corrosion). For simplicity, I used the output terminals of the balun as the mounting screws attaching it to the lower mounting plate.

Balun

For the balun I have used FT140-61 core, on which have I wound 16 turns of RG-174 coax. In this way, I created a 1:1 current balun (also known as an RF common-mode choke). The balun interior is shown in

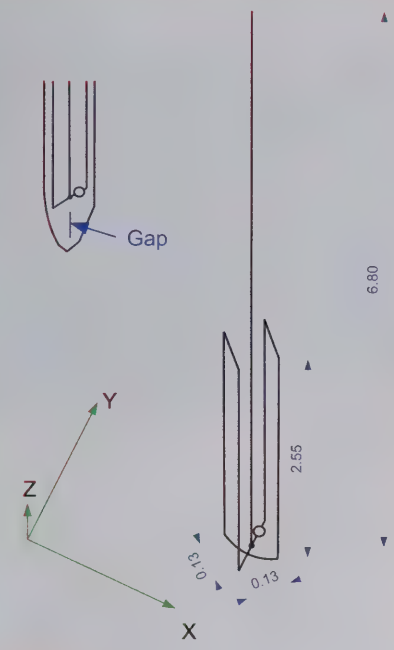


FIGURE 4: Antenna dimensions and the arrangement of wires around the feed point.

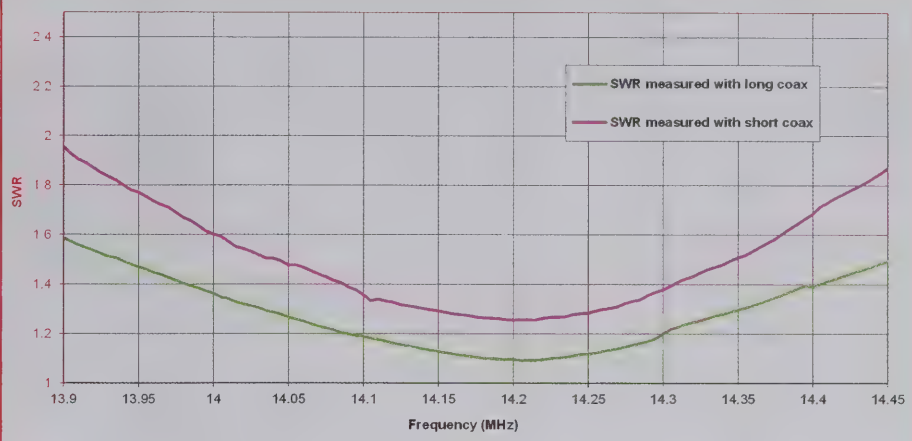


FIGURE 5: SWR measured with a short and a long coax cable. The magenta ink (upper) plot line shows the slightly higher SWR encountered when connecting to the antenna with a short patch lead, compared to the slightly lower SWR seen with a longer cable (see note in text).

Photo 5 (which was was taken before gluing the core to the case). The number of turns is not very critical. For the 20m band you may use 12-16 turns. If you want to drive the antenna with greater power than about 200W I would suggest using FT240-61 core and winding 13-17 turns.

Mount

In order to create an insulated antenna mount, I used a 1m long 20mm OD textolite (a type of glass reinforced plastic) rod. I slipped it from the bottom into the thickest aluminium tube, drilled a hole through the tube and the rod and used a bolt with a nut to join them. You can see the bolt and nut in Photo 2 (above the clamp connecting counterpoise wires to the radiator). The textile rod is attached to the 10mm thick polyamide board with the help of U-bolts. There are larger U-bolts attached from the other side of the board for mounting the antenna on a mast. Instead of a textolite rod you may use just a wooden rod of proper diameter but be sure to condition it properly for outdoor use. PVC tube is not strong enough.

I used a satellite dish wall-mount as a mast for the antenna. The mount was positioned on one side of the balcony railing while a piece of a wooden board, with four holes drilled in it, was on the other side of the railing. After being screwed together, they formed a very solid support for the antenna.

The total weight of the antenna is only about 4kg, so it can be lifted with one hand. Its installation is therefore a piece of cake even when done single-handedly.

Tuning and verification

I tuned the antenna using an antenna analyser. I did it initially on a short temporary mast about 1.5m tall to have easy access to the antenna. I tuned the antenna by adjusting the length of the main radiator made of aluminium tubes. I ended up with 6.80m length.

Then, I moved the antenna to its ultimate position on the balcony and did the final tuning by adjusting the length of the counterpoise wire sagging below the lower mounting plate, seen in Photo 4.

Figure 5 shows SWR plots taken with a very short coax cable (2 metres) and with the final 22m long RG58 cable connecting the antenna with my rig. As you can see, the achieved bandwidth is very satisfactory. With the short cable, the SWR stayed below 1.6:1 in the whole 20m band. With the final cable it was below 1.4:1 *[the lower figure may be due to the cable loss – Ed]*. Every solid state transmitter will drive such antenna system without any problem even if it is not equipped with an antenna tuner.

Performance

Assessing the antenna without comparing its gain to another vertical antenna would be incomplete. Fortunately, I have a multiband ground plane antenna installed in the corner of my garden. This is a GP7dx made by SP7GXP. When operated on the 20m band the active part of its radiator is 6.1m tall. It has seven 1.5m long counterpoises at the bottom and four 1.26m long spokes at the top to form a capacitance hat. This antenna is mounted on a 5m tall mast.

For my tests I decided to use WebSDR receivers to listen to my carrier when transmitted from the new antenna and from the GP7dx. Generally, such measurements require patience because the signal fluctuates significantly after refraction from the ionosphere. You need to observe the receiver signal strength reading for minutes rather than seconds while switching between the two antennas. If you switch on the "Signal strength plot" on the WebSDR receiver webpage, you are able to discriminate signal level differences down to perhaps 1…2dB. But even over short periods the received signal strength fluctuates by as much as 15dB. So, you really have to observe the plot for a longer period of time and often switch between the antennas to draw a final conclusion.

When testing the new antenna, I was able to hear my own signal in three locations: Chelyabinsk, Saint Petersburg and Latvia. In two locations, the new antenna seemed to be better than the old one by about 2dB and in the third location, I could not tell which is better. I drew similar conclusion when doing reception tests – the new antenna seemed to be better than the old more often than not. However, I must admit that the difference was not very significant.

Conclusion

The vertical with upright folded back counterpoises is a little more complicated than the classic ¼λ ground plane design and a little taller. However, its gain and bandwidth are very good. It performs at least as well as the ground plane version. The antenna is lightweight and thanks to that, installing it is really easy. Its matching network is simple – just a 1:1 balun. Its most prominent feature though is small footprint. You can install this antenna in places where there is not enough space for classic counterpoises and enjoy uncompromised receive and transmit performance.

CHOTA 2020

How many times have we said in the last seven months or so that '2020 has been a challenging year'?

Many events, activities and gatherings have been cancelled, postponed or turned into online events. Fortunately, some events have been able to take place in a different way, thus keeping to the Covid-19 guidelines at the time.

Churches and Chapels on the Air (CHOTA) on 12 September was one event that still managed to put some stations on the air, despite the pandemic, by operating from individual amateurs' homes or a single person stations.

John Wresdell, G3XYF is the organiser of the event and has helped by collating the reports shown here. He says, "I am indebted to Mike, M0VOZ who operated GB0LOW for me. Being a working farmer and the harvest being ten days late this year, I could not get on the air. I gather conditions were not good. GB0LOW contacted nine other CHOTA stations located from the South West, South East and the Midlands."

GB5SH St Hilda's Church

GB5SH operated this year from the home of G3NUA on the western edge of Hartlepool because of the Covid-19 restrictions. This led to a considerable reduction in the number of operators compared with previous years. We also missed the aerial suspended from the tower of St Hilda's Church and its location at the edge of the sea on the Headland.

Nevertheless, the FT-450D and trap dipole, operated mostly by Martin, G1YHP, on 80 and 40m, yielded 30 contacts, eight of which were with CHOTA stations, whose comradery we enjoyed. A number of stations recalled contacts with GB5SH in previous years, including one with the Bishop of Durham himself!

From his car on the drive, David, M0NXA, used a Yaesu FT-7900, Kenwood TS-590 SGE and an Anytone 4m transceiver. With a variety of whip aerials, he made 11 contacts on 6, 4 and 2m as well as 70cm over a pleasing area of Teesside, North Yorkshire and into the North York Moors. Operating under their own callsigns from their homes, the wider 'GB5SH Team' made a further 20 contacts with CHOTA stations. This all made for a most enjoyable and memorable day.

John Hogg, G3NUA

Geoff, G4ACS operating on behalf of Kinver Methodist Church from his home station. Callsign used was GB4KMC.

GB4KMC Kinver Methodist Church

This year, because of Covid-19 issues, I could not operate on behalf of St Barnabas Church Kidderminster. So I operated from home on behalf of Kinver Methodist Church, GB4KMC, I live in the village of Kinver.

I chose to stay on 80m and had a great day, operating from 8am to 4pm with a 30 minute break for lunch.

Conditions were average to poor, lots of noise and QSB. From mid-day to 2pm, signals were much lower in strength, some below my noise, improving as the afternoon went on. However, I did manage 112 contacts and that included 18 different churches, chapels or cathedrals. Overall it went well. I had a lot of supportive comments and thank-yous for putting on the station.

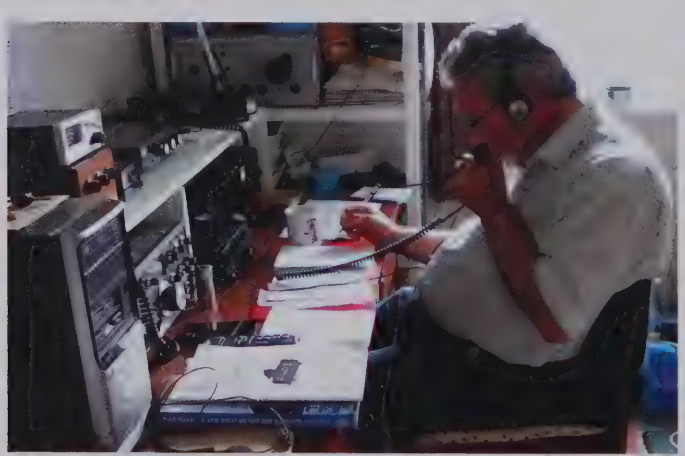
My set-up was an Icom IC-7300 into an Ameritron AL-811H amplifier giving 400 watts to a nest of dipoles at 30 feet above ground, one of which was an 80m resonant dipole.

Although I worked as a single operator, my local friends chipped in, on frequency, from time to time with support. They all said they hope to be able to get together as a group for next year.

Geoff, G4ACS

GB0BHM Blackshaw Head Methodist Chapel

This year, the Halifax & District ARS made a late decision to put on a CHOTA station and decided to run GB0BHM as a portable station in the garden of one of our club members who lives near to the Chapel. This had the advantage of not breaching the local Covid-19 restrictions, although the weather was a bit against us being cool



Martin, G1YHP operating his home station on 80m for GB5SH.

David, M0NXA operating VHF and UHF from the driveway for GB5SH.

Some of the club members operating GB0BHM whilst sheltering from the wind-blown rain.

with a fairly strong breeze all day and several rain showers to dampen enthusiasm. The sun did come out after about 1.30pm and we had clear blue skies and sunshine albeit still with a strong breeze. After the last couple of years, we decided to work only 80m as the other bands seem to be dominated by contests. Nevertheless, we managed to do almost as well as the last couple of years – when were inside in the warmth and dryness of Blackshaw Head Methodist Chapel. We worked 13 other CHOTA stations compared with 14 in 2019 and 13 in 2018. The total number of QSOs was about the same at 45. We did pack up around 3pm as we'd had enough of the wind by then but I think we could have got more QSOs in the log. Band conditions were odd with some signals suffering QSB of various rates but most stations we worked gave us 58 or 59 reports and we were able to report the same – where we were, there was not much interference on UK stations.

We fully intend to be back again next year – assuming that we're still not still suffering Covid-19 restrictions – and hope to be better organised.

Martin Cox, M0GQB

GB4TC St Quiricus and St Julietta

We had a great day and worked more than double the number of stations than in 2019. When it came to 4pm we had to apologise about closing down as there were a number of stations still calling us. GB4TC was on 80m and 2m all day and the only downside for us was the fact we worked fewer CHOTA stations than in 2019.

Looking forward to 2021!

Clive, G4NAQ

GB4DCF Driffield Christian Fellowship Church

Operated from home this year as many others did, the advantage for me of course was being able use my full size G5RV rather than an hoc antenna down the side of the church, which is normally the case.

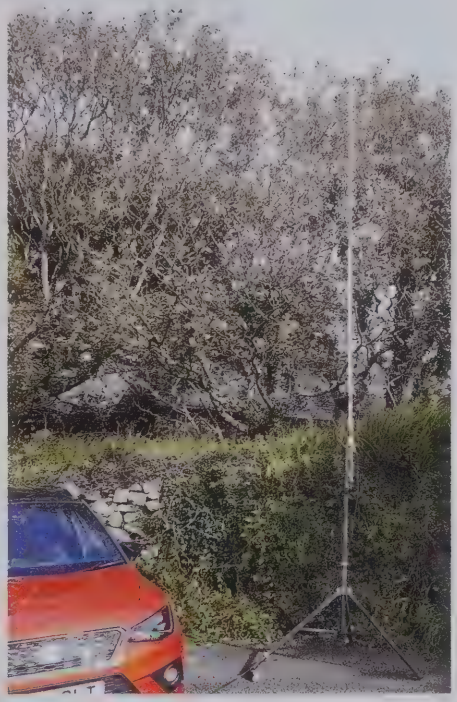
I started operations in earnest around 1.30pm and conditions were pretty noisy. I could hear some CHOTA stations in the noise but they certainly were not workable. I remained on 80m most of the afternoon on SSB with the odd CQ on CW and a short skirmish on 40m, which again was very poor here.

All in all, I logged 23 contacts. Ten of these contacts were CHOTA stations and several WACRAL members called in. I was happy with that given the conditions.

An excellent turnout again this year and a good effort given the current global situation.

See you next year.

Mike, G4SMB



A Hustler G7 antenna was used for the portable 2m activities as GB1SDC.

The DK9SQ vertical loop covered 20m and 40m at GB1SDC.

GB1SDC St Dennis Church

GB1SDC from St Dennis Church in Cornwall ran from 10am until 3pm when the band gave up. Working mainly on 20m we made 25 contacts, some inter-G and across Europe. Equipment was a Kenwood TS-570 with a DK9SQ vertical loop to cover 40 and 20m. A Hustler G7 was used to cover 2m. Thanks to Lisa, 2E0PXI, Rich, 2E0TGK, Luke, M6YEN, Station manager Mike, G1NRF and all that called in.

Mike, G1NRF

GB1HTP Holy Trinity Platt

Having taken part in CHOTA previously from my church, Holy Trinity Platt Manchester, the challenge to operate from home turned out to be a useful deadline to get a new antenna up and tested. My half-size G5RV had failed earlier in the year and was never a good radiator on 80m so a new design was recommended by my club, Bolton Wireless Club. It is a terminated inverted U designed by Chris, G4HYG and published on his company's website www.crosscountrywireless.net.

I gave the antenna a trial on the RSGB SSB Field Day and the 80m Autumn Series contest and found that my station was competing successfully.

Operating from around 10am on CHOTA day, I contacted 10 SES from cathedrals and churches – or because of the Ofcom relaxation of rules – from GB stations operating, like me, from home. These were all on 80m where I had the least noise. What was interesting and of some reassurance about my new antenna was that where signals were marginal, the other stations were also reporting significant difficulties. In the log were: GB4KMC (Geoff), GB4TC (Ron), GB5CCC (David), GB5SH (John), GB0BHM (Martin), GB1SKC (Cliff), GB0LOW (Mike), GB0CBC (Simon), GB4DCF (Mike) and G3NGX/P (Harry).

Mark Bryant, M0UFC

GB0STC St Trillo's Chapel

An ideal opportunity for North Wales ARG arose for the CHOTA special event on 12 September. As the group is based in Rhos on Sea (near Colwyn Bay), the acclaimed smallest 16th century chapel in the UK, is only a few minutes' walk away. Making use of the club caravan as well as various members using portable VHF and HF transceivers and antenna systems, a very successful day on the air was achieved using GB0STC.

Tony Mottram, MW6TMQ

radcom@rsgb.org.uk
www.wacral.org/chota-2020/

PL-259 problems

PHOTO 1: Disassembled compression-type PL-259 plug for RG-58 coax. The 'top hat' is in the centre.

PHOTO 2: Different sizes of centre pin insulator.

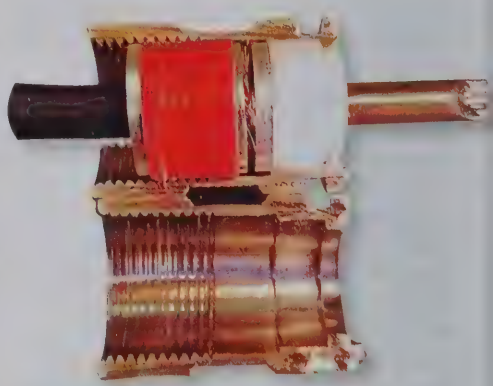


PHOTO 3: Sectioned PL-259 plug body.

I had an issue whereby my signal dropped and was unreadable. I made sure that everything was plugged in correctly, that there were no loose connectors or bad earths, good VSWR etc. The problem seemed to go away – but it wasn't fixed. It happened again, this time making my PC go wild: opening programs at random and generally behaving very strangely. There was no sign of anything being loose or damaged and nothing else such as arcing was obvious. So I checked *everything*, thoroughly, end to end, either by substitution or testing with a meter. But the problem kept recurring. I even checked inside the radio but found nothing obviously wrong – and it worked fine into a dummy load, so I moved on.

I noticed a slight intermittency on one coax cable when it was moved around. I ruled out a bad connection with my meter probes – but then found at least two more cables with a similar problem.

I carried out a more thorough test on the offending cables. There appeared to be an intermittent open circuit on the braid. Moving the cable going into the plug didn't seem to make any difference (they were all very tight) but tapping the plug on the bench showed the fault, so I set about dismantling both ends. But everything looked fine: the centre pin was soldered and the braid appeared to be making contact with the 'top hat' sleeve.

All my RG-58 patch cables use compression type PL-259 connectors. I have always felt these were the best all-round design: easy to assemble, only one solder joint and good cable retention. **Photo 1** shows an exploded view of a new plug. The parts, from left to right, are:

- end screw/cable entry
- larger internal diameter washer
- rubber compression sleeve
- smaller internal diameter washer
- 'top hat' braid sleeve
- central pin inside white insulator
- main body.

The key part here is what I call the 'top hat' braid sleeve. You push it up inside the coax braid, leaving some of this spread out over the upper side, which then gets clamped against the washer above it when the whole thing is assembled. This *should* connect with the main outer body of the connector, once assembled, but I had my suspicions that it may not do so properly.

On closer inspection I noticed a small anomaly, shown in **Photo 2**. Careful measurements revealed a different diameter of the central pin insulator between my new stock (left) and one from a dodgy cable. What effect would this have on the seating of the central pin? The two plug bodies differed; the 'large' insulator wouldn't fit in the 'small' body but the other way round worked, though the pin wasn't held firmly and could move laterally, ie it would wobble.

Inside the case there are two machined steps. The first allows the central pin insulator to drop down into the body but not fall through. The second is, I believe, designed for the 'top hat' rim to sit on, as it is slightly larger than the central pin insulator and will therefore not drop into the recess for that part.

Though that dodgy cable had two different plug types, mis-assembly was either impossible or obvious so I probably hadn't identified the real problem. At length I decided to cut a plug in half to see how it fitted together. Although it may be hard to see in **Photo 3**, the 'top hat' is prevented from sitting firmly on the metal ledge provided by the outer body because the central pin insulator is just a few thou too high. This prevents a reliable ground contact. It could just be a tolerance issue, but it seems a bad design. *[PL-259 plugs from other manufacturers may, or may not, have a similar issue – Ed]*

I always assembled these plugs based on the way the parts are supplied inside the plug, ie with the top hat just above the central pin. Nine times out of ten this works, but I decided to check *all* my cables that use this type of plug. Strangely, the first plug I took apart had been assembled differently: the 'top hat' was at the *upper* end of the rubber compression sleeve and was therefore contacting the washer above it (and being held tightly against the metal screw-in cable entry once the whole thing was assembled). It clearly wasn't a plug that I'd assembled.

Nowhere on the internet did I find anyone using this 'new' method. But in principle it seemed like a better idea – and possibly a solution that someone else had invented after having had a problem such as my own.

After modifying my RG-58 cable stripper to suit the revised arrangement I converted all of my cables to what I call my '2020' method and I'm confident the problem has finally been resolved. And I believe it's a better way to assemble these connectors in the first place.

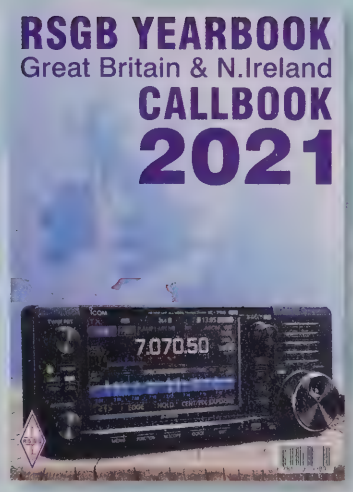
Conclusions

Has no-one else experienced a poor connection between the 'top hat' and main body? Perhaps no-one has checked a large number as thoroughly as I did. Most people might just replace a dodgy connector and not look any further. What is clear is that this is a hard problem to prove, not least because it's intermittent.

The '2020' method works well and is mechanically sound, so I commend it to everyone. And remember, not all plugs are identical, with interchangeable parts, even if they may appear so at first sight.

Graham Dewey, M0OLM
grahamjdewey@googlemail.com

RSGB Yearbook 2021



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Size: 210x297mm, 528 pages. ISBN: 9781 9101 9389 1
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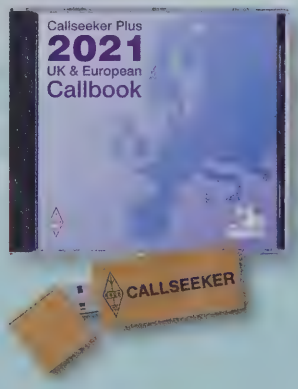
Callseeker Plus 2021



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CD Version: ISBN: 9781 9101 9390 7, Memory Stick: ISBN: 9781 9101 991 4
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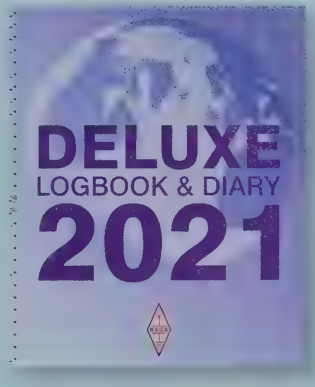
RSGB Deluxe logbook & diary 2021



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Size: 210x225mm, 80 pages, ISBN: 9781 9101 9392 1
Non Members' Price: £5.99, RSGB Members' Price: £4.99

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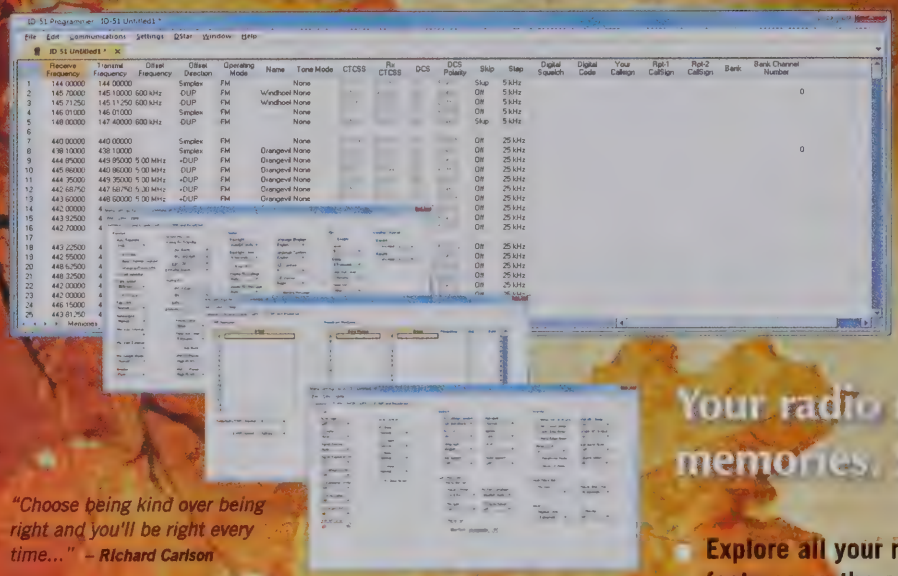

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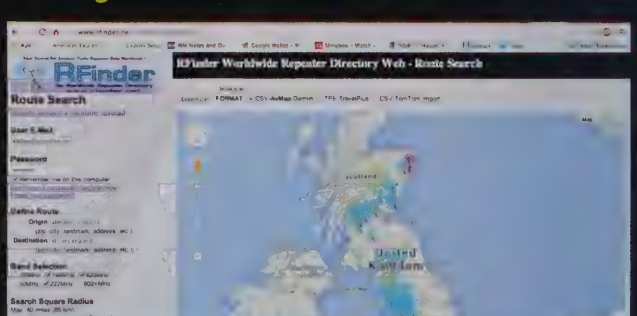

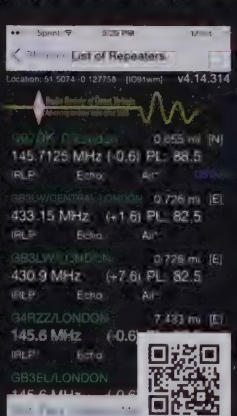

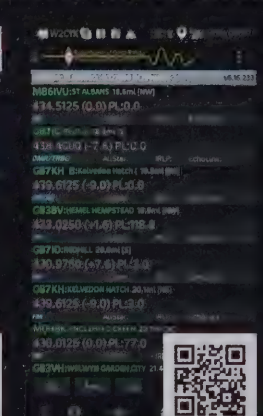

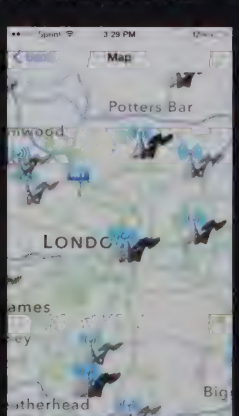

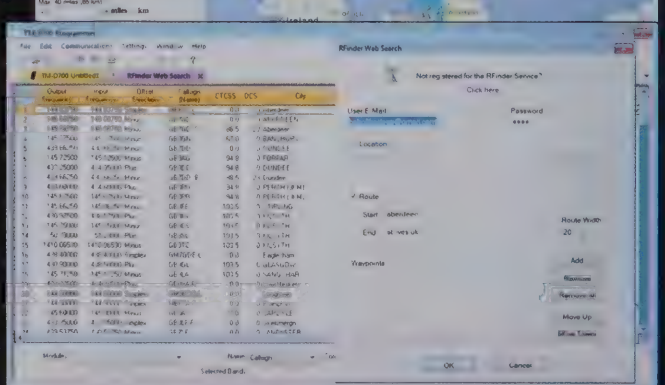

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Please send news reports to radcom@rsgb.org.uk. To get future events listed here and put on GB2RS, email details of your meetings as early as possible to radcom@RSGB.org.uk your club name, RSGB Region number, contact name, callsign & phone number, date and details of meeting. **Example:** Fraser Road Radio Club, Region 9, Steve, M1ACB, 01234 12 700, 29 Oct, talk on anteater breeding, Phil, G9ABC. We normally acknowledge all submissions within 3 working days. If you don't hear from us, please phone. We don't normally include 'closed', 'TBA' or 'every Tuesday'-type entries. **The deadline for December is 21 October and for January 2021 it's 18 November.** For GB2RS, the deadline is 10am the Thursday before broadcast.

CLUB EVENTS CALENDAR

Some clubs are returning to in-person activities, but with Covid-19 restrictions changing rapidly, please note that activities may change at short notice. We strongly suggest you check before travelling to attend an event.

The RSGB recommends that clubs and amateurs follow the government guidelines in place at the time, including any local lockdown restrictions.

Stay safe.

INTERNATIONAL

Pafos Radio Club, Cyprus
Richard, 5B4AJG, 5b4ajg@gmail.com
3rd Thursdays at the BREEZE Restaurant (formerly Hole in the Wall), Coral Bay, 6 for 6.30pm. Visitors welcome.

REGION 1: SCOTLAND SOUTH & WESTERN ISLES

RR: Anthony Miles, MM0TMZ, RR1@rsgb.org.uk

Edinburgh & District ARC
Norman, GM1CNH, 0774 094 6192
Planned events subject to Covid-19 restrictions and may be cancelled.
2, 9, 14, 16, 2, 30 Club net start on 433.525MHz FM at 8pm

Livingston and District ARS
Cathie, 2M0DIB, 01506 433 846
3, 10, 17, 24 Net/club night as advised by current guidelines of Scottish Government

Mid Lanarkshire ARS
https://mlars.co.uk/
1, 8, 15, 22, 29 Net on 28.475MHz from 10pm
4, 11, 18, 25 Net on DMR Scotland chat room TG23550 from 8pm
6, 13, 20, 27 Net on Zello on the club's channel from 7.30pm then on 2m

West of Scotland (Glasgow) ARS
Jack, GM4COX, wosars.club
4, 11, 18, 25 Solder Group 6.30pm (Covid-19 permitting)
6, 13, 20 Club night 8pm (Covid-19 permitting)
27 Construction competition (Covid-19 permitting)

Wigtownshire ARC
Clive, GM4FZH, info@GM4RIV.org
Listen on GB3DG around 12 noon every day when D&G RAYNET have an open net for all
5, 12, 19, 26 Meet on GB3DG at 7.30pm then Zoom at 8pm, see club website www.gm4riv.org for details

REGION 3: NORTH WEST

RR: Kath Wilson, M1CNY, RR3@rsgb.org.uk

Central Lancs ARC
Peter, G3UCA, 01772 494 474
CQ and a brew ±70.450MHz & QSY 2.30pm most afternoons all welcome.
1, 8, 15, 22, 29 Net 1.940MHz, 11am, all welcome
3, 10, 17, 24 Net 70.450MHz then QSY, 7.30pm, all welcome

Oldham Radio Club
Mike, M1CVL, 0740 276 3203
1, 8, 15, 22, 29 Net on XLX305A (Multimode), 9.30am
2, 16, 30 C4FM Simplex Net 144.6125MHz then QSY, 8pm
4, 11, 13, 18, 20, 25, 27 FM Net 145.500MHz then QSY, 8pm
5 Zoom Talk. Weather by Peter, M7PWB 7.30 for 8pm
9, 23 D-Star Simplex Net 144.6125MHz then QSY 8pm

Rochdale & District ARS
Robert, M0NVQ, 0777 811 3333
6, 13, 20, 27 Net from 8.30pm on 145.38750MHz FM. Everybody welcome

Stockport Radio Society
Heather, M6HNS, 0750 690 4422,
Daily CW net 4pm ±3563-65kHz with Bernard, G3SHF/Tom, M0DCG
2 Tips for HF Operating, Evan, M0TJU via Webex 7.30pm
3, 12, 17, 25 Net ±145.375MHz, 7.30-8.30pm with Keith, 2E0JPY
5 Net 433.525MHz, 7.30-8.30pm with Chris, 2E0KJC
10 Net 51.550MHz FM, 7.30-8.30pm with Keith, 2E0JPY
16 C4FM Fusion Net 144.950MHz, 7.30-8.30pm with Alan, G0ROW
24 Virtual Club Meeting using Webex with Tony, M0SAV

REGION 4: NORTH EAST

RR: Ian Douglas, G7MFN, RR4@rsgb.org.uk

Bishop Auckland RAC
www.barac.org.uk
2, 9, 16, 23, 30 Net on GB7CY (digital mode only) from 7.30pm
4, 11, 18, 25 Net on GB3CD from 7.30pm

Houghton-Le-Spring ARC
George, M5GHT, 0191 5488995
1, 8, 15, 22, 29 Net 144.700MHz FM SSTV net, 8-10pm. All welcome
2, 9, 16, 23 30 Morse tutoring / practice for beginners and intermediate 144.700MHz FM 2pm-3pm. Morse advanced practice 144.700MHz FM, 8pm-9pm
3, 10, 17, 24 Morse tutoring / practice for beginners and intermediate 144.700MHz FM 2pm-3pm. Club night 6.30pm with social distancing rules in place
4, 11, 18, 25 Morse advanced practice 144.700MHz FM, 8pm-9pm
5, 12, 19, 26 Morse tutoring / practice for beginners and intermediate 144.700MHz FM, 2pm-3pm
6, 13, 20, 27 8pm-9pm Morse advanced practice 144.700MHz FM. 145.450MHz FM or thereabouts for weekly Friday chat net all welcome, 9pm till close

Hull & District ARS
Tony, G0WJK, 0794 464 8924
2, 9, 16, 23, 30 Net via GB3HS 7pm
4, 11, 18, 25 Zoom ragchewers meeting 7pm
5, 12, 19, 26 Net on ±145.350MHz at 7pm
6, 13, 20, 27 Zoom technical meeting 7pm

Spen Valley ARS
Russell, G0FOI, 01274 875 038
6, 13, 20, 27 Net 145.350MHz 8pm

York Radio Club
www.yorkradioclub.uk,
contactus@yorkradioclub.uk
4, 11, 18, 25 Club net on 145.450MHz, 8pm

REGION 5: WEST MIDLANDS

RR: Vinny Hopkins, M0TAV, RR5@rsgb.org.uk

Burton ARC
Barry, M0ISZ, 01283 540570
1, 8, 15, 22, 29 Open FM net 10am 145.575MHz
2, 9, 16, 23, 30 Slow CW exercise 11am 14.055MHz
4, 11, 18, 25 Club night 19.30 (provisional)
5, 12, 19, 29 Open FM net 8pm 145.575MHz

Central Radio Amateur Circle
text to 0737 552 3259
4, 18 Skype meeting
7, 14, 21, 28 General meeting
16 Net 7.30pm 145.575MHz

Cheltenham ARA
Derek, G3NKS, secretary@g5bk.uk
29 On air Morse training by Andy, G0IBN 8pm 144.060MHz CW net

Coventry ARS
John, G8SEQ, 0795 877 7363
2, 9, 16, 23, 30 Open net on 145.375MHz FM & 7.175MHz SSB 8pm
4, 11, 18, 25 Open net DMR Talk Group 2345974 8.30pm
5, 12, 19, 26 Open net 50.175MHz SSB 8pm
6, 13, 20, 27 Zoom meeting 8pm

Gloucester AR&ES
Anne, 2E1GKY, 01242 699 595 daytime
3, 10, 17, 24 Club net 144.550MHz AM at 8.30pm
4, 11, 18, 25 Club net from 7.30pm 145.475MHz FM
5, 12, 19, 26 Club net from 7.30pm 145.475MHz, then moving to 80m SSB
6, 13, 20, 27 Club net from 7.30pm 432.220MHz SSB

Malvern Hills RAC
Dave, G4IDF, 01905 351 568
4, 11, 18, 25 Net on 145.350MHz from 8pm

Midland ARS
Norman, G8BHE, 0780 807 8003
2, 4, 9, 11, 16, 18, 23, 25, 30 Open net from 7.30pm on 145.425MHz

Deadline
December issue - 21 October

Rugby ATS
Steve, G8LYB, 01788 578 940
Monday to Friday daily net on 144.275MHz SSB from 8.30am
7, 14, 21, 28 Web conference at 2pm

Solihull ARS
Stu, G4KUR, solihullradioclub@gmail.com
5, 12, 19, 26 Net 145.450MHz from 8pm

South Birmingham RS
Martin, M0JZT, m0jzt@zoon.com
3, 10, 17, 24 Coffee morning on line 11am to 1pm using Zoom

Sutton Coldfield ARS
Robert, 2E0ZAP, rob2e0zap@gmail.com
2, 9, 16, 23, 30 Open net starting on 145.250MHz at 7.30pm
4, 11, 18, 25 Club meeting at Sutton Coldfield Rugby Club from 7.30pm till 10pm
10 Open net on 70.475MHz from 7.30pm
24 DMR open net on frequency slot/local 2 gb7fw Birmingham from 7.30pm all welcome to join in

Telford & District ARS
John, M0JZH, 0782 473 7716
4 Committee meeting (Webex)
11 Webex presentation
18 General Webex ragchew meeting + 2m net
25 Running a special event station, G3UKV

REGION 6: NORTH WALES
RR: Liz Cabban, GW0ETU, RR6@rsgb.org.uk

North Wales Radio Society
Liz, GW0ETU, 0776 019 0355
5 Oversight meeting
12 Technical topic ununs, Terry, 2W0TUZ
19 RSBG & Beyond Exams, Liz, GW0ETU
26 How I got into AR, Gron, MW0HTG

REGION 7: SOUTH WALES
RR: Glyn Jones, GW0ANA, RR7@rsgb.org.uk

Carmarthen ARS
Andy, GW0JLX, 0776 828 2880,
1, 8, 15, 22, 29 80m HF SSB net 2.30pm
4, 11, 18, 25 70cm FM or Fusion net on GB3CM 7.30pm
5, 12, 19, 26 Net on GB3FG 8pm

Cleddau ARS
Heinz, MW0ECY, 0774 804 7008
2, 16 Zoom meeting
9 Equipment sort out
21, 22 Mobile ops

REGION 9: LONDON & THAMES VALLEY
RR: Tom O'Reilly, G0NSY, RR9@rsgb.org.uk

Bracknell ARC
David, M0XDF, M0XDF@alphadene.co.uk
4, 18, 25 7.40 to 8pm RF/DMR mixed net via MB7IBK (144.9625MHz, 118.8Hz CTCSS TX/RX) and DMR on TG23529 (Brandmeister) 8-9pm Club net 145.375MHz FM

Burnham Beeches RC
Greg, G4EBY, ebytronics@gmail.com
1, 8, 15, 22, 29 Club net from 10.30am, starting 145.500MHz moving to 145.275MHz
2, 16 Morse training Zoom 7.30pm; Zoom club meeting 8pm see website
9, 23, 30 Morse training Zoom 7.30pm

Edgware & District RS
Mike, G4RNW, 020 8950 0658
Monday – Friday 3pm 145.500MHz FM and QSY All are welcome
2, 9, 16, 23, 30 Net 9pm 145.500MHz then QSY. 9.30pm 1988kHz LSB ± QRM
5, 12, 19, 26 Net 9pm 50.140MHz ± QRM

Newbury & District ARS
Rob, G4LMW, 0797 088 5614
7 Foundation Course (weekend 1 of 2)
15 Foundation Course (weekend 2 of 2)
25 AGM (provisional)

Radio Society of Harrow
Linda, G7RJL, lcasey100@outlook.com
1, 8, 15, 22, 29 Net from 2pm on 145.350MHz
3, 10, 17, 24 70cm net on GB3HR from 8pm
5, 12, 19, 26 Club net from 8.15pm on 145.350MHz

Shefford & District ARS
David, G8UOD, 01234 742 757
5, 12, 19, 26 Net at 8pm starting on 145.5MHz

Verulam ARC
Bob, g4pvb@yahoo.com
1, 8, 15, 22, 29 The 6m Morse conversation net, 8.30pm 50.040MHz. All are welcome. Send QRS for slow

Whitton ARG
Ian, G0OFN, 0795 620 3495
4, 11, 18, 25 With restrictions in place: Jitsi video conferencing at 8pm, accompanied by a net on 145.375MHz FM and/or 28.395MHz SSB
6, 13, 20, 27 With restrictions in place: Jitsi video conferencing at 8pm, accompanied by a net on 145.375MHz FM and/or 28.395MHz SSB With restrictions lifted sufficiently: Club night – HF / VHF on the air at usual venue at 8pm

REGION 10: SOUTH & SOUTH EAST
RR: Keith Bird, G4JED, RR10@rsgb.org.uk

Bredhurst R&TS
Nicky, secretary@brats-qth.org
5, 12, 19, 26 Open net on GB3DA from 8pm

Bromley & District ARS
Andy, G4WGZ, 01689 878 089
4, 11, 18, 25 Net, make contact on 145.500MHz at 9pm, then move to a clear frequency, often 145.400MHz, for an hour or so of chat

Cray Valley RS
Dave, G8ZZK, 0773 954 9822
5 SDR Play presentation
12 Net on 3.720MHz
14, 21, 28 Intermediate Licence training course parts 1, 2, 3 and exam
19 Hybrid zoom meeting

Crystal Palace R&EC
Damien, 2E0EUI, 07900 242541
4, 11, 18, 25 Club net from 8pm around 145.525MHz
6 Virtual club meeting on Zoom
7, 14, 21, 28 Club net from 8pm on 51.55MHz

Fort Purbrook ARC
Rod, G4SPS, g4sps@fparc.org.uk
2, 9, 16, 23, 30 Open net 8pm 145.275MHz
6, 13, 20 Open net 7pm 433.450MHz QSY GB3IW 7.30pm for a joint open net with IOW ARS
27 Club meeting via Zoom

Guildford & District RS
Tim, G7JYQ, 020 8241 9396
1, 8, 15, 22, 29 Club net 145.525MHz, 9.15pm
2, 9, 16, 23, 30 Club net 28.535MHz, 9pm
6, 13, 20, 27 Zoom meeting

Horndean & District ARC
Stuart, G0FYX, 023 9247 2846
6, 29 Club meeting

Surrey Radio Contact Club
John, G3MCX, 020 8688 3322
1, 8, 15, 22, 29 Net 1905kHz 9.30am
3, 10, 17, 24 Net 51.55MHz FM 8pm
5, 12, 19, 26 Open Net 70.30MHz FM 8pm
6, 13, 20, 27 Open Net 144.6125MHz D-Star 7.30pm; 145.35MHz FM 8pm

REGION 11: SOUTH WEST & CHANNEL ISLES
RR: Dean Brice, G0UIL, RR11@rsgb.org.uk

Cornish RAC
Steve, G7VOH, 01209 844 939, G7VOH@btinternet.com
3, 10, 17, 24 FM net 70.425MHz
5, 12, 19, 26 FM 29.150MHz
6, 13, 20, 27 FM net 145.350MHz

Exeter ARS
Ivor, G6ATJ, 0792 762 8685
3, 10, 17, 24 Club net on GB3EX from 7.45pm

Isle of Avalon ARC
Matt, 2E0FNT, 07305 549 614
3, 10, 17, 24 9pm digimode net 28.118MHz USB
4, 11, 18, 25 9pm 2m net with CW practice on 28.118MHz USB
5, 12, 19, 26 9pm 433.475MHz FM net
6, 13, 20, 27 Net 7pm 145.475MHz

Newquay & District ARS
Terry, 2E0XTM, tcmaguire@btinternet.com
11 Club night

Thornbury & South Gloucestershire ARC
Stephen, M0UTK, secretary@tsgarc.uk
Daily 'Stay well' net on GB3ZB at 10.30am
4, 11, 18, 25 Zoom meeting, 8pm
6, 13, 20, 27 Net on 145.450MHz±, 8pm

Torbay ARS
Kerry, M0KRE, kerry@m0kre.net
1, 8, 15, 22, 29 Nets 14.270MHz from 9.30am; 145.575MHz from 12 noon
2, 9, 16, 23, 30 Nets 3.663MHz from 10.30am; 1.982MHz from 8pm and 50.155MHz from 8.30pm
4, 11, 18, 25 Nets 14.270MHz from 9.30am; 3.663MHz from 10.30am
6, 13, 20 Club meeting 7.30pm, plus net on 3.663MHz from 9.15pm
7, 14, 21, 28 Net 3.663MHz from 10am
27 Guest Speaker at 7.30pm, club net 3.663MHz 9.15pm

Weston Super Mare RS
Barry, M0JOG, 0750 066 8674
2, 9, 16, 23, 30 Normal meetings

Deadlines
December issue - 21 October
January issue - 18 November
February issue - 16 December

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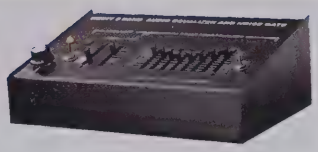

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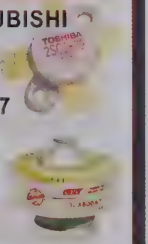

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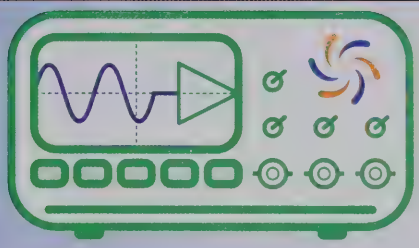

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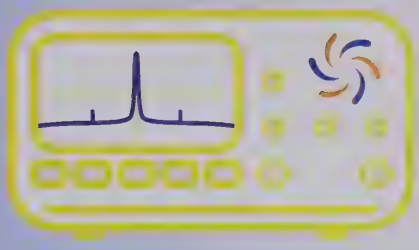

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REGION 12: EAST & EAST ANGLIA

RR: David De La Haye, M0MBD, RR12@rsgb.org.uk

Bishop's Stortford ARS
www.bsars.org
4, 11, 18, 25 Net from 8pm on 145.5625MHz FM

Braintree & District ARS
Programme updates at BADARS.co.uk
3, 10, 17, 24 Club net 8pm 145.375MHz

Chelmsford ARS
Jon, M0KGX, Jon@M0KGX.com
1, 8, 15, 22 On air Morse training by Andy, G0IBN 8pm 144.060MHz CW net
2, 9, 16, 23, 30 On air Morse training by Andy, G0IBN 7.30pm 3542kHz, 8.15pm 3555 GB2CW slow morse transmission. 8.30pm QRS for the new operator
3 Club Xtra Net, 8pm, GB3ER
5, 12, 19, 26 On air Morse training by Andy, G0IBN 7pm Skype CW classes
10 Club net, 8pm, GB3DA
17 Club net, 8pm, GB3ER
24 Club net, 8pm, 3756kHz

Colchester Radio Amateurs
Mark, M0LTG, 0770 374 5369
1 Open net on 50.225MHz from 7pm, open CW net on 144.163MHz SSB from 9.30pm
2, 8, 9, 15, 16, 22, 23, 30 Open CW net on 144.163MHz SSB from 9.30pm
3, 10, 17, 24 Open net on FM 433.425MHz from 7pm, open net on 1.920MHz from 8pm
4, 11, 18, 25 Open net on FM 145.350MHz from 7pm
5, 12, 26 Open net on 3.685MHz from 7pm
29 Open net on 28.225MHz USB from 7pm

Felixstowe & District ARS
Paul, G4YQC, pjw@btinternet.com
1, 8, 15, 22, 29 Open net 10am 145.400MHz
2, 9, 16, 23, 30 Open net, 7.45pm GB3IH
3, 10, 17, 24 CW open net 7pm on 144.070MHz
4, 1, 18, 25 DMR net 7pm TG840

Laindon Radio Club
Stuart, G6RAQ, stuartwhayter@btinternet.com
27 Meetings recommence at 8pm

Lowestoft District & Pye ARC
secretary@ldparc.co.uk
1, 8, 15, 22, 29 Club net 433.575MHz
2, 5, 9, 12, 16, 19, 23, 26, 30 Evening net on GB3YL, club net on 70.400MHz
3, 10, 17, 24 Club net 145.475MHz
6, 13, 20, 27 Club net 51.490MHz

Norfolk ARC
Chris, G0DWV, 01603 898 308
2, 9, 16, 23, 30 Net on GB3NB from 7.30pm
4, 11, 18, 25 NARC Live! show streamed at 7.30pm to its Facebook page and BATC stream. www.norfolkamateurradio.org

South Essex ARS
Terry, G1FBW, 0798 607 0040
Daily net, 4pm, 145.225MHz FM
10 Club virtual meeting 145.225MHz FM

Thurrock Acorns ARC
Iain, G4JMM, acorns@taarc.co.uk
3 VHF SSTV open net starting on 144.500MHz 7.30pm
6, 13, 20, 27 VHF open net starting on 145.500MHz 7.30pm

Deadline
December issue - 21 October

21 Essex 2 metre Activity Afternoon 1pm - 5pm
24 VHF SSB open net starting on 144.300MHz 7.30pm

REGION 13: EAST MIDLANDS

RR: Mark Burrows, 2E0SBM, RR13@rsgb.org.uk

Kettering & District ARS
Ed, M0TZX, M0TZX@yahoo.com
5, 12, 19, 26 Net from 7pm on 145.300MHz FM

Leicester RS
Sandra Morley, G0MCV, 0793 027 4044
2, 9, 16, 23, 30 Net on 145.300MHz from 7.30pm, all welcome
6, 13, 20, 27 Net on 145.325MHz from 7.30pm, all welcome

Loughborough & District ARC
Chris, G1ETZ, 01509 504 319
1, 3, 8, 10, 15, 17, 22, 24, 29 Club net from 7.30pm around 145.425MHz

Nunsfield House ARG
Paul, G1SGZ, pr@nharg.org.uk
2, 9, 16, 23, 30 Net on 433.450MHz, 8pm
5, 12, 19, 26 Net 145.325MHz, 8pm
6, 13, 20, 27 Zoom meeting, 8pm

Welland Valley ARS
Peter, G4XEX, QTHR, 01858 432 105
2 Club net, 7.30pm, 145.275MHz FM

Dr John Butcher, G3LAS – Silent Key

John passed away on 12 September at the age of 84 having suffered a number of strokes earlier in the year. Licensed in 1956 while on National Service in the RAF, John went on to spend many years on VHF and UHF followed by a period of inactivity until, by his own admission, he became 'born again' as a keen DXer in 1995. Once back into the hobby he took an active part in the RSGB, serving as Chairman of the Management Committee, the IOTA Committee and CDXC. He was also involved in the HF Convention Organising Committee.

CDXC AGM in 2009 when John, G3LAS received a plaque from Neville, G3NUG (now also SK). Photo courtesy Nigel, G3TXF.

Colin, G3PSM remembers John as an active member of the RSGB HF Committee until it was stood down in December 2003, then becoming part of the Spectrum Committee. During his time on the HF Committee, John kept a critical eye on developments affecting the HF bands and was particularly concerned at what seemed to be an increase in the level of deliberate interference being caused to DXpeditions. John wrote an information paper on this subject that was submitted to the IARU Region 1 2002 San Marino Conference.

Roger, G3KMA recalls that in 2004 John became an IOTA checkpoint, one of just two for UK amateurs, and continued in that role until 2011. During this period he served on the IOTA Committee and from 2006 to 2009 as its Committee Chair. He showed himself as a strong supporter of IOTA with the programme's interests very much at heart and achieved a very respectable score of 961 IOTA groups.

While studying at Cambridge University in the late 1950s, John operated the G6UW station and became a Life member of the Cambridge University Wireless Society. He spent the bulk of his career teaching and researching in universities retiring as Pro-Vice Chancellor at Middlesex University in 1995. John's PhD researched electrical, optical and thermal properties of thin films of arsenic sulphide and his later work involved semiconductor physics and silicon technology with his primary research interest being silicon-oxide interfaces and silicon-on-insulator technology.

For my part I really got to know John in 2007 when I became secretary of CDXC. John was Chairman from 2001 until I succeeded him in 2009. To say he was enthusiastic about DXing would be an understatement. He produced some amazing results from his home near Harlow in Essex, where we would meet for CDXC Committee meetings and where he and Rachael hosted a memorable CDXC summer social event. But in 2013, at the age of 77, he and Rachael upped sticks and moved to just outside Lincoln where he had more land and where he built an entirely new – and bigger – station. His final DXCC tally was 350 all-time / 339 current. He was missing only Desecheo.

If there is one comment that has continually cropped up in condolence messages, it is 'a gentleman'. I think that sums John up perfectly.
Chris Duckling, G3SVL

REGION 4: NORTH EAST

Pontefract & District ARS is based at Carleton Community Centre, a mile from Pontefract town centre. Every year the Centre holds a Family Fun Day for the children and the club operates a special event station using the callsign GB4CCC.

Unfortunately, with the Covid-19 restrictions, things were very different – a much smaller event with fewer activities. The club decided to still put on the SES, but with restrictions in place. They were already keeping a log of attendees at club nights, using of hand gel as appropriate, seats spread out and equipment disinfected after each use, so they didn't see any problems operating.

As the weather forecast was for a dry day, they set up the VHF radio outside, with one table for the operator and another for the logger, well apart. The HF shack was used, but with only one person operating, and Vic, M0VBV used PSK from his mobile campervan. They were able to 'fence off' the stations, allowing others to see what was happening, but at a distance. This meant club members were well isolated.

They were joined by Peter, M0WEC, a friend from the Wakefield club who has joined them several occasions operating special event stations. As well as Vic and Peter, Keith, G0RLN, Nigel, G0BPK and Terry SWL made up the group. Terry is waiting to sit his Foundation exam and the club is trying to source a computer and webcam so he can take it online.

The special event station went on the air at 1029UTC, working a couple of friends from the Denby Dale Club – Brian, G0BFJ and Barry, G4TML who were operating portable from a trig point 1300 feet above sea level in the Pennines. Although there was at least one contest on, very little was heard on HF, either SSB or digital, though things improved slightly as the day wore on. The main band was 2m FM with some good contacts made, including Steve, M0STN, Northamptonshire and Steve, G4ZWY, Herefordshire.

Further special event stations will be severely restricted due to the latest guidelines, probably only one person operating either the club station or members operating from home.

REGION 5: WEST MIDLANDS

Apologies to **Telford & District ARS** Exams Secretary and BE Champion, Graham, G7LMF, for getting his callsign incorrect in the October *RadCom*. He reports that some club members have enjoyed trying some new aspects of amateur radio and even revisiting some old and forgotten things. He reports that they had to do virtual certificate presentations during their weekly online Webex meetings due to the current Covid-19 restrictions.

South Birmingham RS have reported that they are hoping to hold small meetings in the club shack, but that idea is subject to the rapidly changing Covid-19 restrictions. The club's Facebook page is being kept up-to-date with the latest details.

Reg, G8VHI decide that when he was running GB50BOB, the RAFARS special event station for the Battle of Britain, he should fly the RAF ensign.

Deadlines

Send your news stories and photos to radcom@rsgb.org.uk by

21 October for the December issue issue

18 November for the January 2021 issue.

Have you had an interesting online club meeting, tried SOTA operating for the first time, built a club project with online instruction? Tell us what you've been doing.

REGION 6: NORTH WALES

North Wales Amateur Radio Group during lockdown (so far...) The group's motto of radio/friendship certainly proved the case during the Wales lockdown since it originally occurred in March. On many occasions, committee and club members have come to the aid of their fellow members – helping them with deliveries of food and household goods and keeping in frequent contact. Despite restrictions on weekly meetings, events have been carefully planned enabling amateur radio activities to continue safely including organising special event stations.

On the weekend of 7/8 March the group participated in Exercise Blue Ham. Then, in June, the group decided to organise an event to help and support the local zoo in Colwyn Bay. They provided, collected and even delivered vital food and supplies to the zoo keepers and staff at the Welsh Mountain Zoo. The event station with its callsign GB0WMZ was on the airwaves for a month. Alongside the QRZ.com page, it certainly proved a success in highlighting the problems and concerns facing this local zoo during the lockdown period. Armed Forces Day (GB0AFD) was also commemorated by the club in June.

These special event stations and various interactive meetings helped keep group members active.

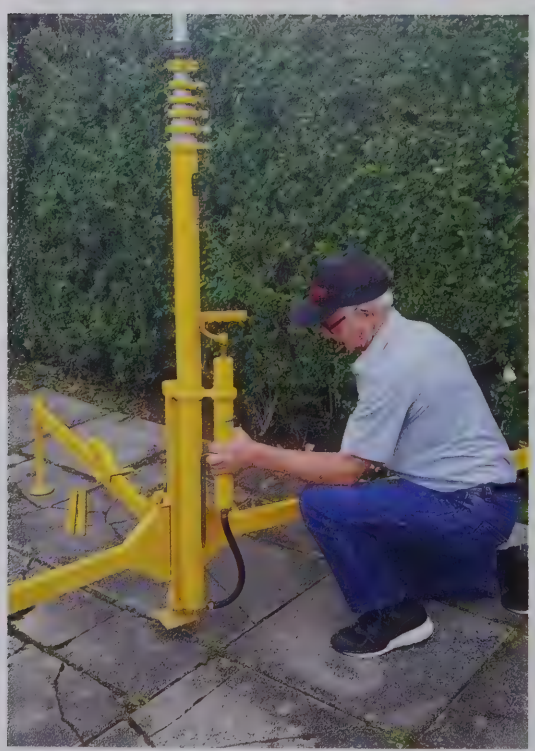
July saw a new chapter with the establishment of a professional live on-air internet radio station managed by John, MW0JWP. Between him and Tony, MW6TMQ, requests are played on the live shows broadcast every week. Club news bulletins complete with loads of fun and laughter is now a regular slot in the club's weekly entertainment programme. The NWARG Live radio station is on 24 hours a day playing a wide variety of music for all tastes.

The group also participated in commemorating the 75th Anniversary of VJ Day complete with callsign GB1VJD on 15/16 August. A few weeks later, club members were required to marshal and use radio communications and provide first aid cover for the Spitfire 10k event from Colwyn Bay Pier to Llandudno Pier. The event was organised by committee member John, MW0JWP accompanied by family and friends including Kevin, MW0IBT. Radio communication and marshalling proved successful ensuring the competitors safety from start to finish. The Spitfire 10K run was in aid of the RAF Museum Trust in order to honour those served during the Battle of Britain.

The next special event station was conducted adjacent to the Great Orme Tramway on Llandudno's Great Orme summit to coincide with ROTA, this was a two day event that also was carefully planned and organised to adhere to the current Welsh coronavirus guidelines. The group achieved this very successfully and mobile HF antennas and transmitters were set up by Tony, MW6TMQ whilst VHF communications were operated by David, GW6MOI in his converted van. The event station also was attended by recent new members Chris, MW7BJW, Gregg, 2WOTWD and Steve, MW7BXY who all enjoyed their introduction to HF communications high up on the slopes of the Great Orme National Park.

The membership has increased and now stands at over 50 and is still increasing due to the online exams. The group's tutors have had six Foundation and one Intermediate passes, which is great news for the club and amateur radio.

For more information on the North Wales Amateur Radio Group, go to www.nwarg.org.



REGION 9: LONDON & THAMES VALLEY

Whitton Amateur Radio Group regularly consult government Covid-19 guidance and regulations. Based on that guidance, they endeavour to update the website as far in advance of each meeting as possible to indicate which scenario is envisaged.

If restrictions are lifted sufficiently to permit the club to meet at the usual venue during November, this is what they plan to do. The normal venue is now considered to be Covid secure and they have a risk assessment in place relating to social distancing / room ventilation / use of a transceiver etc. The club did meet at Whitton Community Centre twice in September, however the club realise that restrictions may tighten again.

With the lockdown due to Covid-19, Verulam ARC has not been able to hold its normal monthly meetings. Instead it held an Antenna Shootout competition with a lockdown theme. Entrants had to build their antennas from items they already had at home or in their shacks. The 6m band was selected due to the prevailing favourable conditions and the results included delta loops, dipoles and rhombics. Following a successful meeting using Zoom, it was decided to continue with monthly virtual talks. Club Chairman, Greg, M0PPG agreed to lead the way with a talk on Arduino. It was also decided to take advantage of the fine weather for a working party to maintain masts and antennas at the club's operating cabin on Dunstable Downs. Weekly club nets continued to be held on Tuesdays and Sundays using different bands plus CW, training and improvement sessions. Further details about the club's activities and more, can be seen at its website at www.verulam-arc.org.uk.

REGION 10: SOUTH & SOUTH EAST

Chippenham & District ARC is now running an online Foundation course. Since the Covid-19 outbreak, they have switched from classroom-based training to online training via live hosted training sessions. The current course started in October. They restrict numbers to a maximum of seven candidates and use interactive software so that students can participate and get used to answering multiple choice questions as we go through the course material. If you are interested in future courses, you can contact the club via their website, www.chippenhamradio.club.

Fort Purbrook ARC and its trainer, Graham, M0CYX, recently celebrated the exam success of two club members. Both had the confidence and knowledge to pass Foundation and Intermediate via the new online examination and video invigilation system. Congratulations to Len, M7LJC and Martin, 2E0FVG on their achievement and allocation of new callsigns.

REGION 11: SOUTH WEST & CHANNEL ISLES

On Friday 11 September, Dennis, G7AGZ activated GB8RTB on Roughtor summit on Bodmin Moor in Cornwall. The weather was cold and windy, but he made 34 contacts on both 2m and 70cm FM. This activation was again in aid of Cornwall Hospice Care and this year's project raised £1229.65. His overall total in 32 years has now passed £21,000 using amateur radio for fundraising in Cornwall.

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LAM Communications	99
Labtronix	87
Martin Lynch & Sons	2, 3, 4, 49, 50, 51, 52, 92, 100
Moonraker	28, 29
Radioworld	70, 71
RFinder	84
RF Parts Company	87
RSGB	9, 11, 23, 47, 67, 74, 75
RT Systems Inc	84
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SDRplay	21
SOTAbeams	21
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W2IHY Technologies	87
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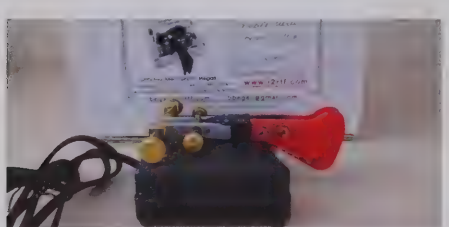
Members may email a Members' Ad of up to 40 words to memads@rsgb.org.uk. **You must include** your name, callsign, phone number, email address and location (these details are not counted in the 40 word limit). Optionally, attach your own photo of the item (*at least* 800 x 600 pixels, in good focus and well lit). *DO NOT just download a photo off the internet. We do check.* Max 1 ad per Member per month; other terms & conditions also apply (see tinyurl.com/MemAdsInfo). **We no longer accept ads by post or phone.**

We encourage all Members to comply with Government guidance regarding travel, social distancing and meeting to pick up equipment. Please keep yourself and others safe.

FOR SALE

AOR 8200 MARK 3 wideband hand held receiver. Includes telescopic antenna and carry case. Only needs 4 AA rechargeable batteries. £125 ONO plus £10 courier delivery. Trevor, M3TVN, 01642 452189 (Normanby, Middlesbrough).

ATAS 120 active tuning antenna, suitable for Yaesu radios. Used, but good condition. £150 ono plus delivery. Dave, G6ZSN, 0787 893 1954 (Taunton).



BEGALI SIMPLEX MONO BASIC single lever key, fitted with plug and lead. Excellent condition, hardly used. £95 including second class UK postage. Brian, G0WZX, 0759 620 3424, brianstevens1@btinternet.com (Surrey).

CLARK EX-MILITARY MODEL PU12, 11.4 m (37ft) 8-section telescopic mast, good condition. Cosmetically bottom section shows blemishes on khaki coating. Buyer collects, but would deliver to York. £250. Robert, G0WHO, 0779 947 6412, g0whormc@gmail.com (Scarborough).

COMPLETE rotator housing, DL1100 winch, stub mast, ground socket, winch wire, head load maximum 30kg, operating instructions. £425. Buyer collects. John, M0OJG, 01789 764889, johncanning1@outlook.com (Alcester, Warks).

CONTESTING AND DXING QTH, West Sussex. Large (2777 sq ft) quiet secluded four-bedroomed detached country home with enclosed swimming pool, stunning views and three acres; 60 and 80 feet towers, lots of room for antennas. See http://g4bue.co.uk/House-for-Sale/ Chris, G4BUE, 01798 815711, chris@g4bue.com (Pulborough).

DETACHED HOUSE, NORTH SCOTLAND COAST, 2 double bedrooms, 2 reception, fitted kitchen, wetroom, bathroom. Large detached garage. About 1/3 acre. Very rural yet amenities close. Few RF noise sources! Can see sea, aurora… Fibre broadband area. OIRO £200k. what3words: radio.standard.stitching. Giles, G1MFG, 01234 832 714, giles@rsgb.org.uk (Bettyhill).

EDDYSTONE 358 RECEIVER of World War Two. Complete with all 9 coil packs. Ex Bletchley Park Radio Museum. Good cosmetic condition. Untested. Collection only. David, G3ZPA, 0754 825 5131, davidg3zpa@gmail.com (Milton Keynes).

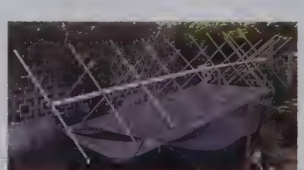
ELECRAFT K3 ROOFING FILTERS: KFL3B FM £90, KFL3A 1kHz £90, 2 off KFL3A 250Hz £120 each, KFL3A 200Hz £85. In excellent condition, complete with mounting screws and washers. Price includes p&p to UK addresses or collect. Tel, G4MKP, 0784 160 2586, terryburbidge56@gmail.com (nr Cambridge).

FLEX 1500 SDR RADIO. Tx: 160-6m, 5W, CW, SSB, AM, FM, digital. Rx: 490kHz-54MHz. Boxed. USB & power cable. 2.4"H x 4"W x 7"D, 1.5lb. Immaculate. Tested (video available). £500, free UK postage. James, G4ILW, 0776 666 2662, jamesd@mac.com (Gateshead).

FOUR BEDROOM CHALET BUNGALOW, no near neighbours, half acre, located in open countryside near Turves, Cambridgeshire. 2 bathrooms, kitchen, lounge, garage/workshop, utility room. P60 heavy duty Versatower with full planning, radios, amp all included at no extra cost. OIRO £250k. Ivor, G4YIT, 01733 840268, g4yit@yahoo.co.uk.

ICOM IC-R71E. Mint condition. Enabled for 13.8V operation, cable included, also link to run on AC. RC11 remote control, original manual. Fitted with Piexx non-volatile EEPROM board. Collect or postage extra. £450. Martin, M0WZM, 07340 325 709, martinkitt@mail.com (Winchester).

ICOM SM20 desk microphone, very little use and in good condition, £55 inc postage. George, G4CMU, 01306 631115, george@brind.org.uk (Newdigate, Surrey).



JAYBEAM 10XY 2m crossed Yagi. 20 elements and 90° phasing harness for either RHCP or LHCP. With original instructions and catalogue. Gain (peak) 10.8dBd. Boom length 3.6m. Weight 5.9kg. £80. Buyer collects. Alan, G3UCF, 0759 684 8736, alan.passmore@me.com (Basingstoke).

JBEAM TB3 14-28MHz 3-ele tribander, £75. KLM KT34A 4-ele 14-28MHz, 16ft boom, £150. Tennadyne 12-ele log periodic, 10-33MHz, 30ft boom, £300. All GWO, ready to reinstall. Must collect. Ron, G3SEY 0782 559 5453 (W Yorks).

KENWOOD PC FLOPPY DISKS. TS-870S Radio Control Program (on two disks) and VCH-1 Visual Communicator AOR VC-1S V1.00 Control Program (on one disk). Worked under Windows 95 – anything newer isn't guaranteed and/or may need an emulator. £10 each plus p&p, or collect. David, G5HY, 0791 261 9001, david@g5hy.com (east Dorset).

METROVNA 250 DELUXE ANALYSER £175. Yaesu FRV 7700 VHF transverter £45. Yaesu FRT 7700 ATU £25. Maplin Transistor Dip meter £20. Wolfwave audio processor £160. Vibroplex Mono key black base £75. Vibroplex straight key £50. Colyn, GD4EIP, 0762 441 3036, gd4eip@wimanx.net (Isle of Man).

MY FAITHFUL HL2200 linear amp by Heathkit. Just back from full service by G3ZRS. 100W in 1kW out, Eimac tubes like new. Must be collected. £650. Have upgraded. Les, GM3ITN, gm3itn@gmail.com (Dumbartonshire).

OPTIBEAM OB7-3 triband Yagi. Dismantled and cleaned, all parts marked for easy re-assembly, complete with all hardware and original manual. £400. Prefer buyer to collect but could possibly ship at cost. Howarth, GW3TMP, 01352 771520, jhj43@btinternet.com (Mold, Flintshire).

SEM TRANZMATCH ATU. Special unit, all options fitted, 160/80/10m switching, Ezitune aerial switching/bypass/dummy load, special circular marker discs/reduction drives to capacitors, unbalanced/balanced aerial terminals, black cabinet special finish. Front panel near mint. £225 inc delivery. Terry, GW4RLP, 01286 675264, terencehv@outlook.com (north Wales).

SILENT KEY SALE: RA17L RECEIVER. In good exterior condition and fully working when last used approximately one year ago. Offers over £350. Buyer to inspect and collect from LL43 2AG. Mrs Goslin, 01341 247485 (South Wales).

TEKTRONIX 7834 400MHz storage oscilloscope in GWO with about 50 plugins and spare mainframe, many original manuals, £499. Also 7L12 spectrum analyser plugin £350. Three Tektronix 500 series mainframes with a few plugins £50. Heavy, so inspect and collect. Terry, M0CLH, 07842 812188, m0clh@tiscali.co.uk (Wantage, Oxon).

SPECIAL EVENT STATIONS

The following information was kindly provided by Ofcom on 2/9/2020. More may have been issued since and some callsigns may be missing from the list if the holder has elected to decline publicity.

NoV Start Date	Callsign	Event	Location
01/11	GB4CKS	Charles Kingsford Smith	Burnham on Sea
03/11	GB8LWF	Lima Whiskey Foxtrot	Lisburn City
07/11	GB6RD	ASE	Holmfirth

TRIO TS780 V-UHF multi CTCSS fitted. Daiwa LA-2080H 80W linear with preamp. Yaesu FT-2700H, CTCSS fitted. Microset UHF amp RU2-45. G4XWQ, 01271 377001 (Devon).

YAESU FT-757 GX2, 100W SSB, FM, AM, CW. Everything works and generally in good condition. Would prefer it be inspected and collected, but will post at P&P cost and at buyer's risk. £150 ono. Glenn, G6HFF, 0779 092 2130, glenn.bates@talk21.com (Bolton).

WANTED

COUNTRY PROPERTY, rural or semi rural required, suitable for radio operations. All areas considered, with purchase up to £400k. Bob, G0WAY, 0747 452 4699, bobslimmon@yahoo.com (Staffs).

DRAKE TRANSMITTER wanted to work alongside my R-4B receiver (with PSU if possible). Fair price paid for a nice radio in good, working condition. Also interested in other Drake receivers and transceivers radios in similar condition. Malcolm, G4TJK, 01483 827572, charlie.porter1@ntlworld.com (Surrey).

DX100 TX by Heathkit. Preferably serviceable but any condition considered. Alan, G4BLI, 0775 982 1742, g4bli@uwclub.net (Plymouth).

EDDYSTONE 898 DIAL SPARES. Require the large gear with its spindle for the gearbox, or a complete dial unit. R Riddington, G4IHT, robert@riddington.me.uk, 01285 841203 (Tetbury).

JRC 245 transceiver. Jim, G3UZB, 01642 470623, jim.shewan@ntlworld.com (N Yorks).

KPC4 et al manuals required. Installation, Operations and Commands all ver 3. I have a number of pages missing from my copies. Roger, G0CYC, 01707 324958, r.curtis503@btinternet.com (Welwyn Garden City).

PDF of original *Electronic Design* article March 1973 "Blend ECL and TTL ICs to obtain High Frequency Counter Circuits" by Jon Delaune of Motorola Semiconductor. Nigel, G8AYM, nigel-pritchard@outlook.com.

QSL CARDS: silent key clearóut or just not wanted – please don't throw them away. I collect QSL cards for historic interest and research. Any date but prior to 1970 preferred. Can collect or arrange collection. Tony, G4UZN, AQuest1263@btinternet.com (Leeds).

SERVICE MANUAL wanted for Kelvin Hughes Husun 60 marine VHF radio. C Scouller, M6IZF, 0796 050 6589. 15scouller.c@gmail.com (Brookmans Park).

USER MANUAL for the Radio Shack Pro 2045 Scanning Receiver. Richard, G0FXI, 0117 9636981, richard.oram@btinternet.com (Bristol).

WORKING KENWOOD TSU-6 CTCSS board for TH25e. Kenwood TS-870S working condition but anything considered, can pick up if not too far! John, G4LGX, 01423 567390, jra_hall@hotmail.com (Harrogate).

UP FOR GRABS

AR88D, working order, FREE for collection only. Graham, M0GGU, 01588 650661, edlicott11@btinternet.com (Shropshire).

STANDARD C520 2m/70cm handheld, not working. Complete with AA battery case and CMP115 speaker mic. CTN520 CTCSS board fitted. Free: buyer collects or pays postage. John, G4JEN, 0759 437 3947, john.e.norris@talk21.com (Hemel Hempstead).

HELPLINE

G4UXD Morse Tutor Program. I purchased a copy of this software in the early 90s but have mislaid the password information. If you can give me any clues from a copy you may have eg it is based on postcode etc. this will narrow down repeated tries to discover the same. Richard, G3XWH, Richard@G3XWH.com.

RALLIES & EVENTS

Covid-19 has meant many rallies have been cancelled or postponed. We strongly recommend you check with organisers before travelling and observe all national & local Covid-19 regulations.

The following list reflects the best information available as of 6 October 2020. An up-to-date list is maintained on the RSGB website at https://rsgb.org/main/news/rallies/

1 Nov
– CANCELLED –
Holsworthy Radio Rally

15 Nov
– CANCELLED –
West London Radio & Electronics Show

22 Nov
– CANCELLED –
Bishop Auckland Radio Amateurs Club Rally

28 Nov
– CANCELLED –
Rochdale & District ARS Summer Rally

6 Dec
– CANCELLED –
CATS Radio & Electronics Bazaar

SILENT KEYS

We regret to record the passing of the following Members.

Name, Callsign	Date
Mr A E Gladwin, G3FVO	14/08/2020
Cdr W Nicoll, G3KWN	11/2019
Mr J B Butcher, G3LAS	
Mr B E Moyler, G3LTM	
Mr D Jones, G3UVR	
Mr G Barber, G4KYO	7/2020
Mr E David, G4LQI	
Mr C G F Munton, G4XMS	23/07/2020
Mr R Evans, G8FOZ	24/08/2020
Mr A Mather, G0OHY	30/08/2020
Mr J McDonald, GI0THR	
Mr D Powis, M0WIS	03/08/2020
Mr M Forster, M0YCL	12/09/2020
Mr G P R Turner, 2E0BVQ	13/07/2020
Mr T Bowron, M7TJB	01/08/2020

To notify us that a Member has passed away, please email details to sales@rsgb.org.uk or phone 01234 832 700, option 1. We need to know the Member's name, callsign and, ideally, date of death.

Ofcom should also be informed. Phone them direct on 0300 123 1000.

RSGB is often asked for assistance in dealing with the shack and equipment of a Silent Key. In the first instance, contact the RSGB Regional Representative for your area – you'll find their names and email addresses at the start of each area listed on pages 85 to 88. They, or their local deputy, will be able to give free, impartial advice based on individual circumstances. The usual options are to offer larger items for sale on eBay, or at the local radio club, or at a rally; small items such as accessories and components are often best offered via a 'silent key sale' at a radio club. Club sales usually involve a small commission that goes to club funds. There are, of course, other possibilities and the Regional Representative will help to the best of their ability, acting sensitively at what we recognise to be a difficult time.

Rally dates for 2021

12-14 Feb – **Orlando HamCation®, Florida, USA**
Postponed to 11-13 Feb 2022

?? Feb – **BRATS Rally** – CANCELLED

25 Apr – **Northern Amateur Radio Societies Association Exhibition**

13 Jun – **East Suffolk Wireless Revival**

13 Jun – **Junction 28 Radio Rally**

20 Jun – **17th West of England Radio Rally**

25-27 Jun – **HAM Radio Friedrichshafen**

12 Sep – **Caister Lifeboat Rally**

3 Oct – **48th Welsh Radio Rally**

17 Oct – **Hornsea Amateur Radio Rally**

Please send your rally / event information to radcom@rsgb.org.uk as far in advance as possible

RadCom

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HF F-Layer Propagation Predictions for November 2020

Compiled by Gwyn Williams, G4FKH

	3.5MHz	7.0MHz	10.1MHz	14.0MHz	18.1MHz	21.0MHz	24.9MHz	28.0MHz
Time	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220	000011111220
(UTC)	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020	246802468020
*** Europe								
Moscow	998532469999	648655678568	325766673223	ab2776741aaa	bca46641bccb	ccb3443acddc	ddc1221bdddd	ddda111cdddd
*** Asia								
Yakutsk	643223456777	3eb43fd122b4	d..4c..fef.c	...a.....	...e.....	.....	.....	.....
Tokyo	eed42366555a	1a2655664342	bda543441baa	..f31a1af...	...adfee....	...d.....	.....	.....
Singapore	265554	abf..3665444	abbba4652aa1	eeb12442e..e	..da132c....	...a11a.....	...cbbd.....	...edd.....
Hyderabad	61e...256666	521bb1465554	1c2112452aaa	f.b2233ae...	..e223be....	...a11d.....	...cbb.....	...ecd.....
Tel Aviv	8851efc48888	777421367777	327544563113	dd465553dded	eea4543beeee	eed2221eeeee	eeebabbfeeee	eeedddeffeff
*** Oceania								
Wellington	..c355554...	b11577764abc	11c467652a11	bc.24542dcba	e..d232c..fd	....b1af....	....ece.....	.....e.....
Well (ZL) (LP)	.....	aab......cbb	221cdccbb111	11a1aaaa11aa	ccd1aabbabdd	ef.abccdbd..	...bcef.d...	...de...f...
Perth	......15545f	cd...a565442	abcec3552121	ccba1343ceec	..c1133b....	..da121d....	...baab.....	...cccd.....
Sydney	.....25544..	cbf.3676431c	aabb46641baa	ccb14541f.ec	f.d1332d....	...a22a.....	...cbbd.....	...edd.....
Melbourne (LP)	..a2.....	ca353.....fe	a1144bdcddba	bbe24aaabbab	ee.b2abbbbcd	...eaccdcce.	....ceefee..	....e.....
Honolulu	14455335....	32b555462aba	ae.223242abb	...ddacabdff	.....f.ef...	.....	.....	.....
Honolulu (LP)	.....	.....e....	dce...dabccd	bbbccbbaabbb	bcbaabbcbccc	cdcaabcfcddd	f.eabce.f..f	...bbd.....
W. Samoa	.e255345....	cab56665adcd	ac.356531bab	d..c243bbccc	....b2a.f...	....ead.....	.....d.....	.....
*** Africa								
Mauritius	6.....36656	51d...c65555	3aabcb253212	cea11133beed	..d1112a....	...aaa1c....	...cbbb.....	...eddd.....
Johannesburg	65......2666	65b....35666	432acca44434	ab1211242aba	..c22223cf..	..e12221....	...b111b....	...cbbad....
Ibadan	8885adc16888	777643347777	7376444456544	ada654453acb	e.e55445bf..	...35552e...	...a211a....	...caaac....
Nairobi	774d..f26777	6652aa136666	3153112442 12	cfa42234befd	..e43341....	...1112b....	...bbbbe....	...ddcc.....
Canary Isles	99983ab26999	88885445 7888	865765567855	332366662322	11a13332a1aa	aaba2211babb	bccbaaaacbcc	ccdcbabbdcdd
*** S. America								
Buenos Aires	6656......26	5547....f245	3315addca222	cc.321a11add	...a1111be..	...d11aad...	....babb....	....dccd....
Rio de Janeiro	6661.....a56	6655f...b556	4425abcb2433	aad3211221bb	...12222ad..	...b2111c...	...faaaaf...	....bcbc....
Lima	5555......15	54342...ea34	11c11acba1a1	e...c211abff	.....11ac...	.....aabe...	.....ccd....	.....def....
Caracas	67673c..e257	662641aa1456	aae3521122aa	...c13221c..	....c331c...	....f11ae...	.....bbc....	.....ddf....
*** N. America								
Guatemala	66563.....25	542651ddb234	1ae3331112a1	f..bb3221b.f	.....111bf..	.....baae...	.....ecd....	......ef....
New Orleans	666651ceda46	42b6531a1224	be.2b3212adb	...d.a32ae..	.....d31d...	......ab....	......ce....	......e.....
Washington	787762ba2467	64a563134556	ac.b133443ba	....fa342c..	.....d13b...	......b1d...	......eb....	.......e....
Quebec	777752113567	43b343334534	cd.eb44442cb	.....4441d..	.....b32c...	.....e1af...	......cd....	......ef....
Anchorage	456541322344	2cd2421342a2	e..fceed1cfd	........e...	.....	.....	.....	.....
Vancouver	5566421a1234	3ad33a223313	c..dcfc33bec	.......ab...	.......f....	.....	.....	.....
San Francisco	555652b..ea4	43a553311224	ac.12a2321ba	...ee.b2ad..	.......ad...	.......c....	.......f....	.....
San Fran (LP)	.....	......fb....	edeeedb2cdde	bbbbbba3abbb	bbbbbbc2bbbb	cdccccd1cccc	efeeee.aefee	.......c....

Key: Figures and letters represent approximate S-meter readings. S9 (9) represents 50μV RMS in the 50Ω receiver input impedance, down by factors of 4 in power (6dB) through the numbers to S1 (1), and then continued sequentially below that using letters a to f. Thus, a represents a signal which is 6dB lower than S1, and so on. The colours represent expected circuit reliability, black 0-30%, Blue 30-60%, and Red 60-100%. No signal is expected where a '.' is shown. The predictions use the ITURHFProp ionospheric model, assume 100W Tx power into a dipole antenna, and a matched dipole antenna at the Rx. See Predicting Propagation (*RadCom* September 2020 page 37) for instructions. See also the RSGB Propagation Studies Committee web page for propagation predictions programs, https://rsgb.org/main/technical/propagation/on-line-propagation-tools/, which can be tailored to your own setup.

AM/LOCKDOWN...

Ray J Howes, G4OWY

Now, what is all that about? A 'proper amateur shack' and 'going back to AM' (October 2020 issue).

Yes, AM is or can be a fun mode, if that is what shakes your boat. Personally, I'll take a rain check on that. As for 'going back to AM', what is next on the menu of change, going back to Spark? Hey, that might a good idea, we can create a mountain of interference to annoy everyone else, instead of us always being on the receiving end of the ongoing racket that's enough to make a grown man weep and instead turn to playing tiddlywinks every night, rather than switching on the rig and swinging the beam around for a good long session on HF.

And just what is a 'proper shack'? G3TOI appears to have found the answer. No commercial transceivers. Maybe his solution is just a rat's nest of half completed home-brew projects, a pile of dodgy valve CW rigs that only work on a Sunday afternoons, or when there is a full moon, and probably a huge tranche of miscellaneous prehistoric oscilloscopes and various other RF service equipment that last saw the light of day during a break in Christmas festivities in 1956?

Anyway, what is so wrong with commercial amateur transceivers? *RadCom* is chock full of the bright and shiny things. Page after page of them. Someone somewhere is buying them. And do you know what, long may it continue. Why? Because, put simply, without commercial amateur transceivers etc, amateur radio would have died a horrible death years ago. And if it hadn't of died, a very small coterie of dedicated amateur homebrewers together with a few other like-minded souls who like to spend their spare time hiding in their shacks (whilst their XYLs cook their dinner) experimenting with valves, transistors and bashing sheets of metal to encase their latest creations would, unfortunately, be the only survivors left to represent our hobby.

But of course, that scenario didn't happen. Aren't you all happier now?

Andy Talbot, G4JNT

Interested to see the comment by G4EHT suggesting a domestic radio covering 1.8 to 2MHz. That's unlikely to happen, but any old medium wave tranny can easily be converted to cover Top Band. In Birmingham, in the early 1970s, a couple of years before I was licensed, one of the shops in Hurst Street (Birmingham's equivalent of Lisle St / Edgeware Road) was selling hundreds of surplus MW receiver modules; I think they were called Diskotron units and had a nice slow-motion cord drive. Dozens of amateurs converted these simply by rewinding the ferrite rod and tuning to a frequency where the LO allowed Top Band to be converted to the IF. I seem to recall there was some discussion as to which coverage method was used; either the image response or the second harmonic of the LO; both work and I suspect many people doing the conversion didn't know which they'd used. Two decades later I converted a boot-sale-purchased tranny just to prove it. I feel a paragraph for Design Notes coming on...

THE FUN OF CONTESTING

Doug Turk, G3PQC

The Fun of Contesting! Oh how I agree with Chris Kidger, G0LOL and probably many other amateurs. In my view there are far too many contests – when I switch on and hear "CQ CONTEST", I normally switch off. When I was licensed in 1962 there were fewer contests and most of us had a long and interesting QSO. What has happened?

Ian Simpson, GM0SIM

A suggestion for three simple rules to add to all contests to make them more acceptable to all (whilst not detracting from the contest):

a) only use 'even 10s of frequency' for the contest... ie 0-10 yes, 10-20 no, 20-30 yes ... 200-210 yes etc.

b) if you have 'big boots' you cannot monopolise a single frequency and just 'claim it' to the detriment of all others (including smaller contesters). Implemented by 'you cannot be on any one frequency for more than 10 minutes' and you must move after that time and find a free space yourself. If your log times show excessive single frequency use, then points after 10 minutes will be negative. If you repeatedly stomp on smaller stations to make your new space you will be deducted points.

c) With the easy availability of waterfall displays these days, splattering 'wide boy' contestants will simply be disqualified. Contest organisers to police their own events.

I would be interested to hear the contesters' viewpoint if any of the above is unreasonable.

Contests are international. What we need is for national organisations to agree upon an overarching rule subset for general inclusion in contest specific rules to cut down on the 'might is right' monopolisation of the bands by a minority. And, for any contest organiser that is unreasonable, the slow scan TV contest for next year will simply by scheduled for the same day as their contest next year!

Malcolm Porter, G4TJK

I appreciate that the subject of 'Contests' has been raised in this magazine in many contexts and on numerous occasions. However, I would suggest that the RSGB needs to take a fresh look at this topic that many amateurs consider to be a growing problem.

As usual, this weekend we have heard the bands busy with contests. Of course, we would all agree that amateur band usage is a good thing and, personally, I have absolutely no problem with the idea of contesting.

However, what I do find a problem is the fact that they occupy so much of our band allocation, and for so long.

Would it be possible for organisers to restrict contest band usage by (1) restricting activity to sub-sections of our bands; and, (2) reducing the lengths of the contests? In this way those amateurs who do not wish to participate in contesting can continue their QSOs, be they rag-chewing, nets, or DX'ing.

ELECTRONIC VOICE PHENOMENON

Norman, G8EYM

Not exactly what is intended in the letter (October Last Word), but certainly an example of an Electronic Voice Phenomenon.

As an SWL in the late 1940s, before single sideband suppressed carrier took over, I was visiting a local amateur to get some advice on building a superhet short wave receiver with bandspread.

His station included a Marconi CR100 receiver and an AM transmitter in a 19 inch rack sporting impressive push-pull 813s, whose anodes glowed cherry red. He spoke into his microphone and heard his booming voice come back through the window saying "Hello, Hello, CQ DX 20 ..."

Looking out of the window, we could see a stationary car with a huge horn type loudspeaker on its roof, bestrewn with political posters and a startled passenger looking at the microphone he was holding. Without hesitation, Sam began to recite "Mary call the cattle home, across the sands of Dee ...". With a click, it all went quiet and the car sped off. Ah, happy days.

My thanks to all those amateurs in the North Manchester Radio Club, for the enthusiastic encouragement and advice they gave to this pestering young schoolboy. I was listening.

We have also received several helpful letters that have been forwarded to Josh, M6NJW who first asked the question on electronic voice phenomenon. You can still send any emails on the subject to radcom@rsgb.org.uk and we'll pass them on. Ed

THANK YOU

David, M0TFY

I would like to thank Mike, G8NXD for his incredible generosity. I posted a wanted advert to the SOTAbeams online flea market site (www.sotabeams.co.uk/flea-market/) asking where I might find a low cost key for my 13 year old daughter, who recently asked to learn the code. A couple of quick emails and two days later a WT8 amp mk3 key is in my letterbox free of charge. We have scheduled time this weekend to put together a little oscillator for her to practice with.

The concept of passing it forward is alive and well in amateur radio. Thanks Mike!

radcom@rsgb.org.uk

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MYTH OF REFLECTED POWER

Clive Young, M0BGA

Although it doesn't invalidate his general conclusion, the experiment described by G3JE in *RadCom* September 2020) might be measuring voltages rather than power.

G3VA in *A guide to amateur radio* states "reflected power does not flow back into a transmitter...". To be clear there is no reflected power. There are reflected voltages (hence VSWR).

For a more detailed explanation see F Terman's *Radio Engineers Handbook*. I mention this in the interests of technical accuracy.

USEFUL WORK AROUND

Bob Houlston, G4PVB

I'm going through a medication change and the resultant mild tremor did not bother me until I struggled with a straight Morse key. Using a paddle (not iambic) key with the speed set to 12 WPM on the radio I can now continue my hobby with ease.

TAIL END STORY

Charlie Mitchell, G0SKA

As for his tame blackbird listening to Morse code, when I practice CW using the Morse Contest app on my mobile phone, our chihuahua Larry starts singing loudly, which he also does when music is playing, especially *a cappella* versions of Amazing Grace!

FAVOURITE COOL TOOL

Bob Houlston, G4PVB

Overheard on the Verulam ARC net: *"There's talk of doing away with the practical test for the amateur radio licence. That's a bad thing yeah?"*

Well, no. The only really essential practical thing needed is knowledge of the 1 in 4 rule for ladders. Let's keep things simple for beginners. A full set of tools could be prohibitively expensive.

As a youngster I was given an electric train set to play with and when I wanted to cut, trim and reroute the wires I used my mum's best sewing scissors... *"No Robert!"*

So my dad gave me his spare pair of pliers. I could cut cables, trim and strip the insulation of wires and also adjust various nuts. Best of all it also worked as a light-weight hammer.

Now, 55 years later, I still have it: thanks dad. So apart from a can of WD40 and a roll of duct tape, what's your favourite tool? Well, possibly eye protection?

I'll let you decide.

LOOP ANTENNAS

Alan, G3MGU

I am disappointed at the presentation of my Last Word letter in September *RadCom* as it implies I am talking about a DDRR Antenna, and the editorial post script only implies that fact.

If the letter is read carefully you will see it is *not* about a DDRR antenna, that was only referred to as being the influence that caused the Italian team of Boella, Cugiani, Villa and Zich to develop a new antenna, which they called a "Thin Wire Hula Hoop".

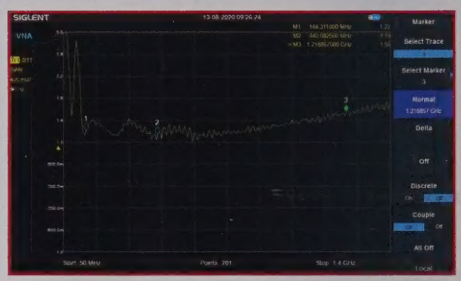
As my interest was initiated by a 2m diameter magnetic loop, which is a large diameter copper pipe, bent into a loop, whose ends are brought together at a high voltage capacitor, used for tuning. The DDRR antenna is similar but the end of the loop is left open, and often a capacitor is connected to the open and earth, for tuning and capable of covering two adjacent bands. The "Thin Wire Hula Hoop" is a complete circle, it is a ring, a ring has no begining or end, it has no capacitor and requires no tuning, as such, only a matching system, which is like a Delta mach.

I have done a series of experiments to establish how to get the best performance, but I was hoping my original letter would encourage someone with more knowledge than I, to provide guidance on improving its construction and performance.

Since my first letter, I have made a second 70cm and 2m aerials, and done some experiments, such as varying the size of the groundplane, height above the groundplane and length of the coaxial feeder, and others.

The most noticeable is the fact that the 2m version has similar characteristics of a Disc Cone, the two images I have added to this mail, are not equal, as the disc cone is fed by low loss 50 ohm coax and the loop is fed by low loss 75 ohm TV coax. The loop itself is mounted on the roof of my caravan, the disc cone is at about 15ft.

I would still like to talk to someone more



knowledgeable than me, as most of my activity has been guesswork.

Apologies Alan for any confusion or misunderstanding. If any Member would like to get in touch to discuss this with Alan, G3MGU, please drop an email to radcom@rsgb.org.uk and we'll put you in touch. Ed

TWO METRES SSB

Martin Timms, 2E0UAC

All too often I hear operators, perhaps trying 2m SSB for the first time, treating 144.300MHz as if they were calling on FM. Giving your callsign and calling CQ on 2m SSB will often yield no results on this portion of the band as most stations use horizontal beams and the chances of them being aligned in your direction are negligible. The answer is very simple, it is essential to give a very long call and perhaps repeat it two or three times; your callsign should be phonetically pronounced and the call should include your city, town, village and locator square. All this will give the receiving station time to bring the beam round in your direction and hopefully make a strong contact.

The SSB section of the 2m band can be extremely rewarding, there are many enthusiastic and experienced operators on this band waiting to welcome and give help to any one new. I know this from my first times on the band, good hunting.

AN ODE TO 144.300 SSB

Derek, G1ZJQ

CQ CQ CQ
This is G1ZJQ

CQ CQ CQ
I would like to *talk* to you

CQ CQ CQ
This is G1ZJQ

CQ CQ CQ
My face is turning blue

CQ CQ CQ
This is G1ZJQ

CQ CQ CQ
Microphone to you...

...silence...

...Shack for sale!

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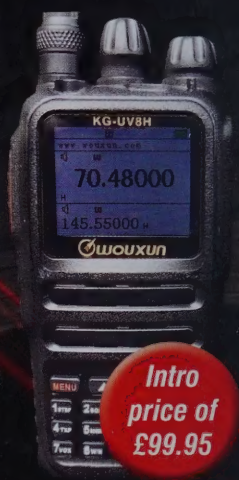

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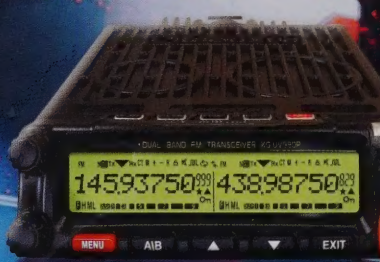

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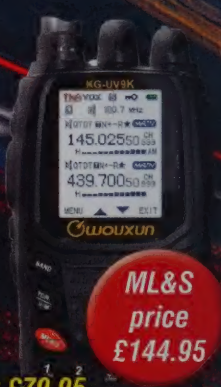
- SMA-PL259 adaptor
- Hands-Free kit



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